Smithsonian

October 1991

Spunk and whiskers

The California river otter tries to hold its own (p. 114)

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October 1991

Smithsonian

Volume 22, Number 7

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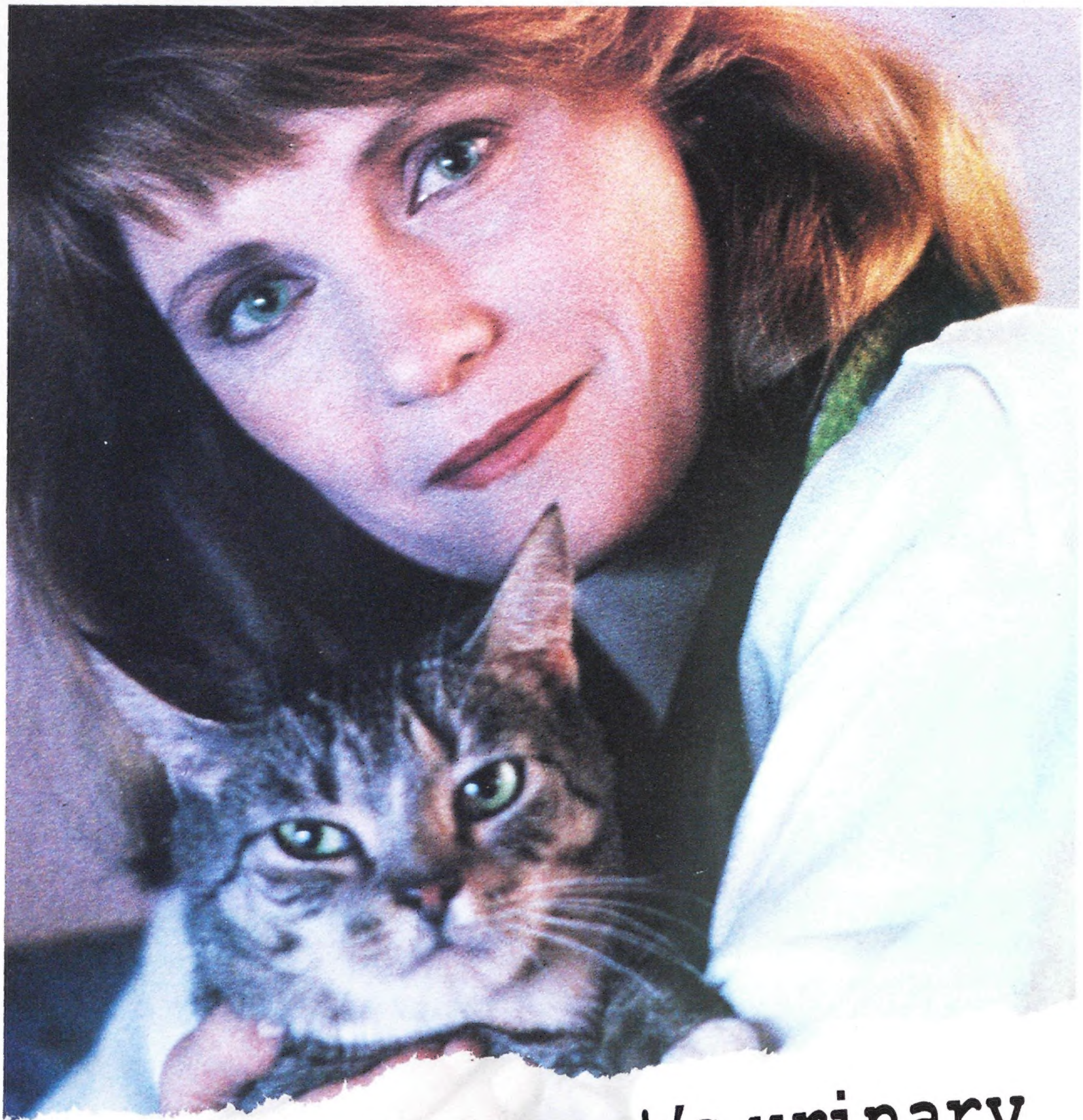

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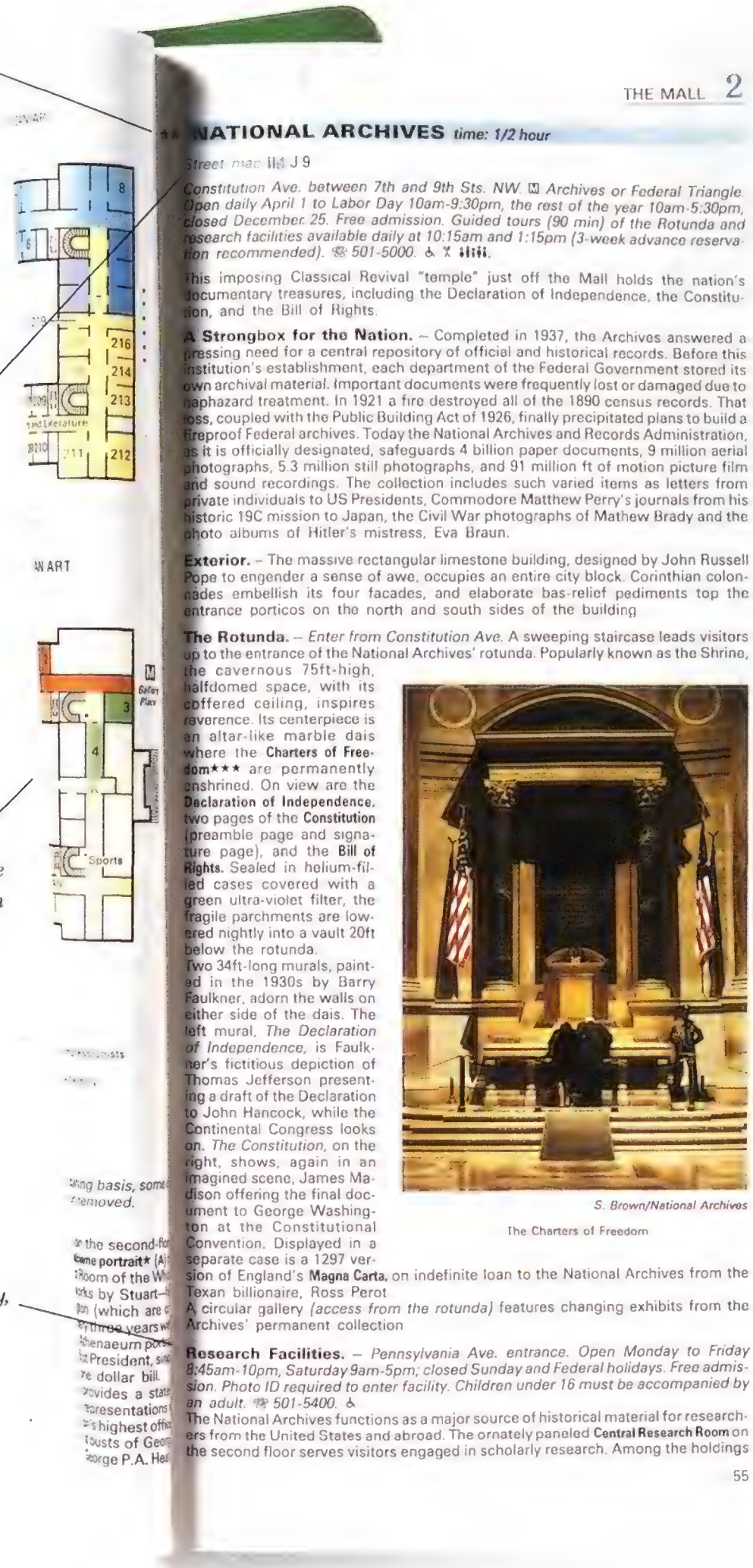

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Street map ⅡⅠ J 9

Constitution Ave. between 7th and 9th Sts. NW. M Archives or Federal Triangle. Open daily April 1 to Labor Day 10am-9:30pm, the rest of the year 10am-5:30pm, closed December 25. Free admission. Guided tours (90 min) of the Rotunda and research facilities available daily at 10:15am and 1:15pm (3-week advance reservation recommended). ☎ 501-5000. ♿ ✕ ⅡⅠⅠⅠ.

This imposing Classical Revival "temple" just off the Mall holds the nation's documentary treasures, including the Declaration of Independence, the Constitution, and the Bill of Rights.

A Strongbox for the Nation. – Completed in 1937, the Archives answered a pressing need for a central repository of official and historical records. Before this institution's establishment, each department of the Federal Government stored its own archival material. Important documents were frequently lost or damaged due to haphazard treatment. In 1921 a fire destroyed all of the 1890 census records. That loss, coupled with the Public Building Act of 1926, finally precipitated plans to build a fireproof Federal archives. Today the National Archives and Records Administration, as it is officially designated, safeguards 4 billion paper documents, 9 million aerial photographs, 5.3 million still photographs, and 91 million ft of motion picture film and sound recordings. The collection includes such varied items as letters from private individuals to US Presidents, Commodore Matthew Perry's journals from his historic 19C mission to Japan, the Civil War photographs of Mathew Brady and the photo albums of Hitler's mistress, Eva Braun.

Exterior. – The massive rectangular limestone building, designed by John Russell Pope to engender a sense of awe, occupies an entire city block. Corinthian colonnades embellish its four facades, and elaborate bas-relief pediments top the entrance porticos on the north and south sides of the building

The Rotunda. – *Enter from Constitution Ave.* A sweeping staircase leads visitors up to the entrance of the National Archives' rotunda. Popularly known as the Shrine, the cavernous 75ft-high, halfdomed space, with its coffered ceiling, inspires reverence. Its centerpiece is an altar-like marble dais where the **Charters of Freedom**★★★ are permanently enshrined. On view are the **Declaration of Independence**, two pages of the **Constitution** (preamble page and signature page), and the **Bill of Rights**. Sealed in helium-filled cases covered with a green ultra-violet filter, the fragile parchments are lowered nightly into a vault 20ft below the rotunda.

Two 34ft-long murals, painted in the 1930s by Barry Faulkner, adorn the walls on either side of the dais. The left mural, *The Declaration of Independence*, is Faulkner's fictitious depiction of Thomas Jefferson presenting a draft of the Declaration to John Hancock, while the Continental Congress looks on. *The Constitution*, on the right, shows, again in an imagined scene, James Madison offering the final document to George Washington at the Constitutional Convention. Displayed in a separate case is a 1297 version of England's **Magna Carta**, on indefinite loan to the National Archives from the Texan billionaire, Ross Perot

A circular gallery *(access from the rotunda)* features changing exhibits from the Archives' permanent collection

S. Brown/National Archives

The Charters of Freedom

Research Facilities. – *Pennsylvania Ave. entrance. Open Monday to Friday 8:45am-10pm, Saturday 9am-5pm; closed Sunday and Federal holidays. Free admission. Photo ID required to enter facility. Children under 16 must be accompanied by an adult. ☎ 501-5400.* ♿

The National Archives functions as a major source of historical material for researchers from the United States and abroad. The ornately paneled **Central Research Room** on the second floor serves visitors engaged in scholarly research. Among the holdings

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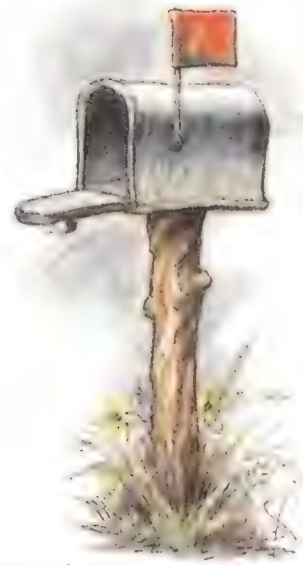

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America needs a ne fast and effective clean

An alarming lack of progress in cleanup.

When Congress enacted the Federal Superfund program in 1980, the goal was to quickly clean up America's most dangerous hazardous waste sites. Congress and many others assumed there would be only a relatively few such sites and that cleanup costs would be limited.

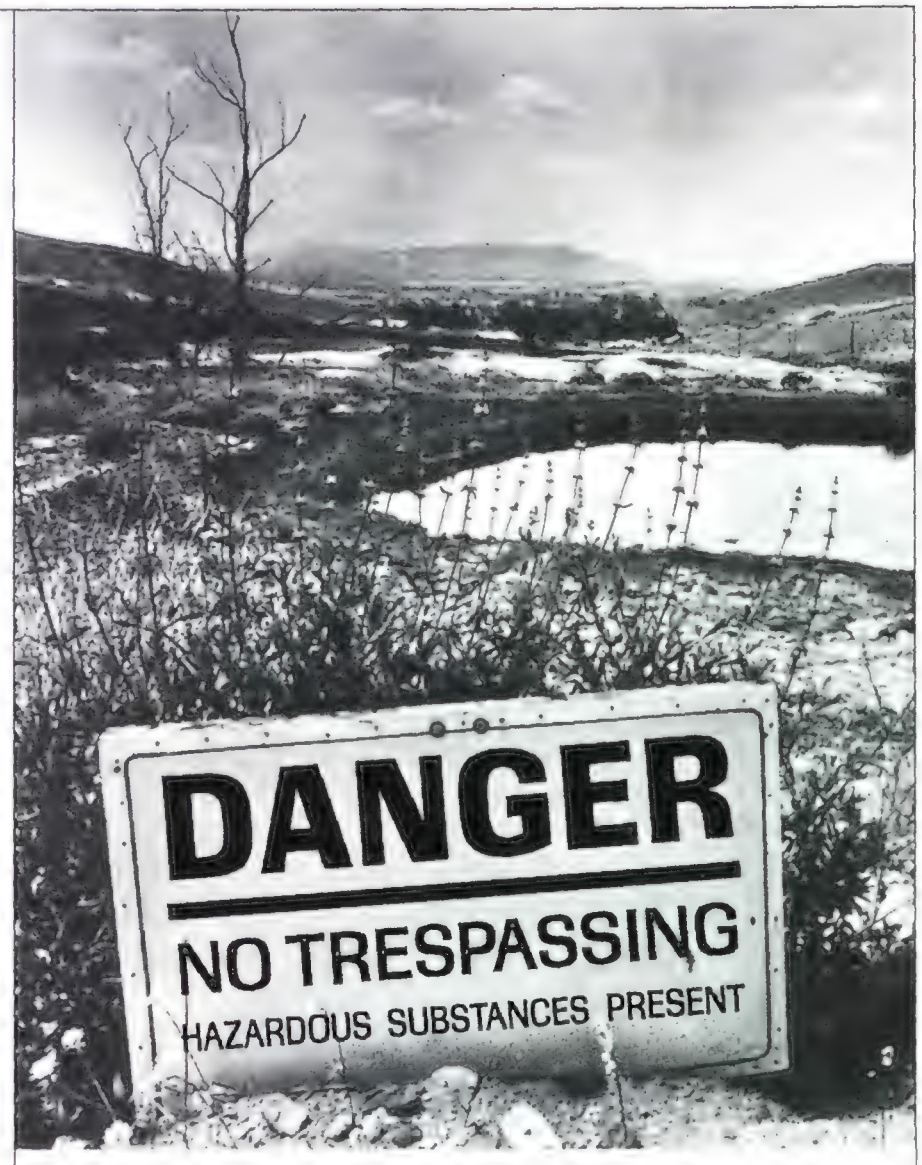
Now, after a decade of trying to make Superfund work, it's clear these assumptions were wrong and that a quick fix was never possible. What's wrong with Superfund and why has so little been accomplished?

The problem is twofold. First, the real scope of our nation's hazardous waste situation is far greater than Congress anticipated. With 1,200 priority sites already identified, growing numbers of sites are being found in every state. The Environmental Protection Agency expects that by the year 2000, there may be as many as 2,000 priority sites.

With rapidly rising cleanup costs, which now average about $25 million per site, the eventual price tag is staggering. According to a top government agency, cleaning up all of America's hazardous waste sites could take from 30 to 60 years and cost up to $500 billion!

A second problem is Superfund's alarming lack of progress in cleanup. A decade and billions of dollars later, fewer than 60 out of the 1,200 sites have actually been cleaned up.

Why? One major reason is Superfund's liability system. It requires that cleanup be paid for by establishing liability–who sent what waste, how much and where–and then negotiating or litigating with those believed to be responsible. While this sounds good in theory, it hasn't worked in practice. Instead, the result has been



delayed cleanup and enormous legal, consulting and other costs unrelated to cleanup.

Compounding the problems instead of solving them.

This is because working out who pays and how much for cleanup is very difficult. Under Superfund, anyone who simply used or owned the site at any time could be liable for the entire cleanup bill. Users can include major corporations, small businesses, local governments, hospitals, nursing homes, schools, even individuals. And it does not matter who caused the harm or whether they did anything wrong. Superfund's retroactive

w system to achieve up of our environment.

liability provision makes parties pay for past actions based on today's standards.

For example, at 422 sites almost 14,000 parties have been notified that they could be liable. In turn, many of them are identifying still others who contributed in some way to the presence of waste at each site. And since Superfund liability deals with past waste disposal, the record of users can go back 25, 30 or even 40 years and can number in the hundreds.

The result? The focus on cleanup has been lost as private and public parties spend years in difficult but unavoidable negotiations and litigation, trying to work out agreements that would provide funds for cleanup. At some sites, more money has been spent resolving complex factual issues than on cleanup itself. This does a lot for lawyers and consultants, but very little for the environment. And of course, these costs are eventually passed on to all of us as consumers in higher prices for goods and services. Isn't it time to stop this wasteful process and get on with cleaning up our environment?

At AIG, we think so. There is little to be gained by arguing over waste disposal that happened long ago. America needs a system that will promote fast and effective cleanup, reduce unnecessary legal fees, spread the cost of cleanup broadly, and encourage responsible waste management practices today.

A PROPOSED SOLUTION: THE NATIONAL ENVIRONMENTAL TRUST FUND.

To accomplish this, we have proposed creating a National Environmental Trust Fund, similar to the National Highway Trust Fund. Its resources would be used exclusively for cleaning up old hazardous waste sites. Superfund's tough liability provisions would still apply for future pollution, as would all other state and federal environmental laws designed to promote responsible waste management.

One way this fund could be financed would be by adding a separate fee to commercial and industrial insurance premiums in the United States. Even a modest assessment, say 2% of premiums and an equivalent amount for self-insureds, would provide about $40 billion over the next decade – more than enough to clean up the 1,200 highest-priority sites. Without endless time and money spent on legal debates about liability.

A national advisory board consisting of private individuals, industry and public officials could be charged with overseeing the program. We also suggest giving consideration to establishing local technical monitoring committees in each community. These groups of local citizens, representatives of industry and others would work with the Environmental Protection Agency and their own state on the particular cleanup site – from the very beginning of the cleanup effort.

YOU CAN HELP.

We've waited long enough and spent enough money in the courtrooms. Now it's time for action. A cleaner America should be all Americans' shared goal and shared responsibility.

To express your views, or if you would like further information about AIG's proposed National Environmental Trust Fund, write to Mr. M.R. Greenberg, Chairman, American International Group, Inc., 70 Pine Street, New York, NY 10270.

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Letters to the Editor

Black Seminole

Dear Sir: Your August article reminded me that many years ago a man came to our house in Florida to discuss stamps with my stepfather. While they talked I sat on our loggia and tried to entertain the visitor's sister. She asked me, "Do you know who chased Geronimo? Seminole Indians."

Then she told me about her youth in Texas and of the Seminole warriors and the Julys. As a small white girl, she sat on the lap of one of the Julys, who told her tales of his youth. He had been captured from his home in Africa with his mother and fattened by Arabs, then sold into slavery to Americans. When the ship bearing the future slaves ran aground off the coast of Florida, he and his mother managed to swim ashore, in chains, and were captured by Seminole. They learned how to live by eating "roons," the Seminole name for mushrooms. He became one of the scouts your magazine described, and the old lady reminisced, with misty eyes, about the kindly gray-haired man she had known as a child.

Arabella Decker
Montara, California

Dear Sir: The picture of the crossed arrows insignia on page 92 stirred me as the sound of a siren stirs an old fire horse. This insignia, but with arrows now pointing up, is alive and active, as it has been with only short lapses since it designated the brave men you wrote about.

It encompassed all Indian Scouts, men from other tribes as well as the Black Seminole. In 1942, when Col. Robert T. Frederick requested it for his then-forming American-Canadian First Special Service Force, there were eight Cherokee braves, in their 80s and still at Fort Huachuca, Arizona, wearing the insignia on their sleeves.

It had to be deactivated, then reactivated, with the arrows turned upward. Men of the Force, aware of the insignia's history, wore it proudly through some of the roughest fighting of World War II. It has been passed on to successor units in both countries. Today it is used by the Green Berets and by the Pipe Band of Canada's Special Service Forces.

All our caps are off to the Seminole-Negro Indian Scouts. They wore it first.

John R. Dawson
Farmer City, Illinois

Dear Sir: Chief Coacoochee's name caught my attention, as I am reading the memoirs of a famous American who was personally involved with the chief.

In 1841, four Indians on horseback approached Fort Pierce, Florida. One, "a black man named Joe, who spoke English, said they had been sent in by Coacoochee . . . to see the big chief of the post." Coacoochee wanted to arrange for provisions so he could move his tribe to their reservation in what is now Oklahoma. The commanding officer, Major Childs, wrote our soon-to-be-famous American, "ordered me to take eight or ten mounted men and go out to escort him in."

After riding five or six miles, the party came to a hammock where "the chief, Coacoochee approached my horse and, slapping his breast said 'Me Coacoochee.' He was a very handsome warrior, not more than twenty-five years old . . . I then explained to him, through Joe, that I had been sent by my 'chief' to escort him to the fort . . . I would provide him a horse to ride, and the sooner he was ready the better for all. He then stripped, washed himself in the pond and began to dress in all his Indian finery, which consisted of buckskin leggings, moccasins, and several shirts. He then began to put on vests . . . one . . . had the mark of a bullet, just above the pocket, with the stain of blood. In the pocket was a one-dollar Tallahassee Bank note, and [he asked] me to give him a silver coin for that dollar. He had evidently killed the wearer, and was disappointed because the pocket contained a paper dollar instead of one in silver. In due time he was dressed with turban and ostrich-feathers . . . and thus we rode back together to Fort Pierce."

The young officer, a recent graduate of West Point, was William Tecumseh Sherman [detail, below]. Later, when Coacoochee did not bring in his tribe as promised, Sherman participated in his capture.

Mark Apoian
Redondo Beach, California

Tractors

Dear Sir: That could have been my grandfather on the threshing crew on pages 56-57, with the John Deere "D"!

I grew up on a farm in Saskatchewan, where I learned to drive many makes of tractors; then studied agricultural engineering, where I learned what makes them tick; then was employed by John Deere, where I put my engineering skills to work in testing and contributing to the design of the best tractor line in the world.

A lot of people mistakenly refer to all tractors as "Caterpillars." I guess it is the ultimate compliment to have one's name used as the generic noun for a product, but the Caterpillar Tractor Company is a competitor, and we get a bit defensive when we hear the word "Caterpillar" used for a John Deere Crawler tractor.

Wayne Collins
Dubuque, Iowa

Dear Sir: At the start of the Great Depression my grandfather Sands took his family to Northwest Iowa to farm land for a friend who had bought up farm mortgages. One of the first to farm with a tractor in that area, he was ridiculed because those steel wheels packed the ground. He was also called an "air-

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plane farmer" because he covered more ground with a tractor than with horses.
Howard Sands
Hanford, California

Dear Sir: The great virtue of the three-point hitch was not entirely the ease of attaching. More important was that the tractor operator could control it from his seat, lifting the plow disk or other implement off the ground, rather than dragging it, as was formerly the case.
R. H. Chamberlain
Flournoy, California

Dear Sir: Regarding the introduction of rubber tires on tractors, Harvey Firestone was initially approached by H. C. Merritt, manager of the Allis-Chalmers Company, in his search for a low-pressure tire for the A-C Model U farm tractor. A Firestone representative remembered a set of 48-by-12-inch airplane tires that had been developed for an unsuccessful project. These were installed on a Model U owned by Albert Schroeder of Waukesha County, Wisconsin, who later stated that his old steel-lug tractor worked at a little better than the speed of a horse, whereas the rubber-tired tractor doubled the pace!

The first rubber-tired tractor was demonstrated publicly near Dodge City, Kansas, on Labor Day in 1932. A farmer from Garden City paid cash for the tractor and drove it home.

It is a matter of record that Barney Oldfield raced a Model U Allis-Chalmers rubber-tired tractor at the Nebraska State Fair in 1933.
R. L. Jefferies
Dallas

Unalaska

Dear Sir: Your article brought back wartime memories of flights in the vicinity of Petropavlovsk. When stationed on Attu in 1944-45 as Navy aerographers (weathermen) my group's responsibility was to fly to the Japanese Kuriles and report on weather conditions to the U.S. Navy's 92d Task Force, which periodically shelled the major Japanese North Pacific naval base at Paramashiro.

Our flights to the Kuriles took us very near the Kamchatka Peninsula and Petropavlovsk. Rarely was serious flak thrown up by the Japanese. But venture off course toward Kamchatka, and our friendly allies opened up on us to let us know we were not at all welcome over "supersecret Petropavlovsk."

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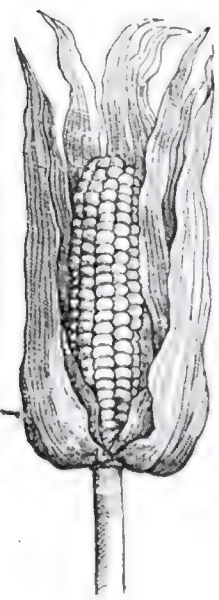
The Explorer.



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Maybe the same paranoid Soviet admiral who could not let the tourists from Unalaska overfly his base in 1991 was in charge then too.
Joseph F. Fahey jr.
Stamford, Connecticut

Dear Sir: I laughed out loud when the hardworking women of the Kamchatka Peninsula started singing "We Shall Overcome"—after talking about the lazy Russian men.
Bill Bluemle
Rosemont, Pennsylvania

E. Fay Jones

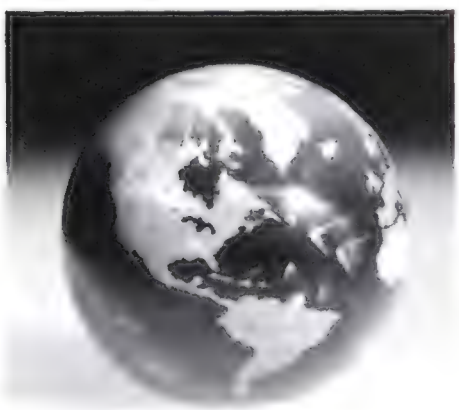
Dear Sir: A true work of art, whether sculpture, music, architecture, literature or any other form, will bring an instant "Yes!" response in mind and heart. I felt this as soon as I saw your photographs of architect E. Fay Jones' work. How perfectly natural. How perfectly right are his beautiful chapels. He is a national treasure.
Cynthia S. Foster
Branford, Connecticut

Bartlett's quotations

Dear Sir: I too was surprised that the leaders of the women's movement did not respond to Mr. Kaplan's request for quotes. To help fill that gap, I pass along the following: Congresswoman Pat Schroeder was the keynote speaker at a California Women Lawyers' Association meeting. "I am frequently asked," she said, "how I can be a United States Congressperson and a mother at the same time. My reply is, I happen to have a uterus and a brain, and they both function quite well."
Susan Keating
Panorama City, California

Dear Sir: Vice President Quayle is not the only person who has paraphrased the United Negro College Fund's slogan, "A mind is a terrible thing to waste." Discussing the college career of their son, Theo, TV's Cliff Huxtable (played by Bill Cosby) tells his wife, Claire, "My money is a terrible thing to waste."
Frank Holan
Westminster, Vermont

Dear Sir: When she was a little girl my mother's uncle Ken teased her by saying, "You talk so much you must have been vaccinated with a phonograph needle." How clever he was to have



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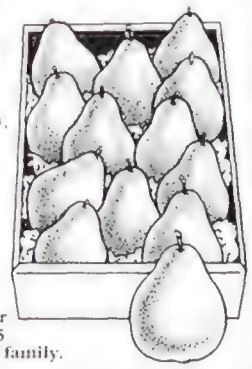

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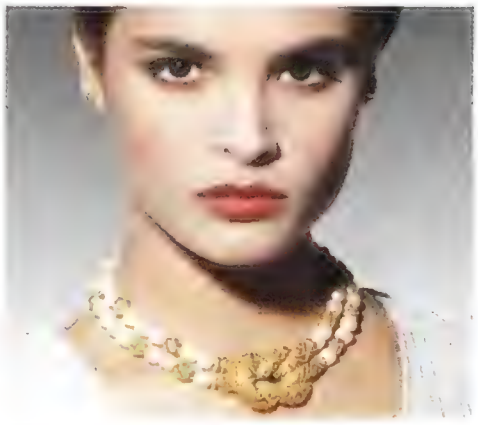

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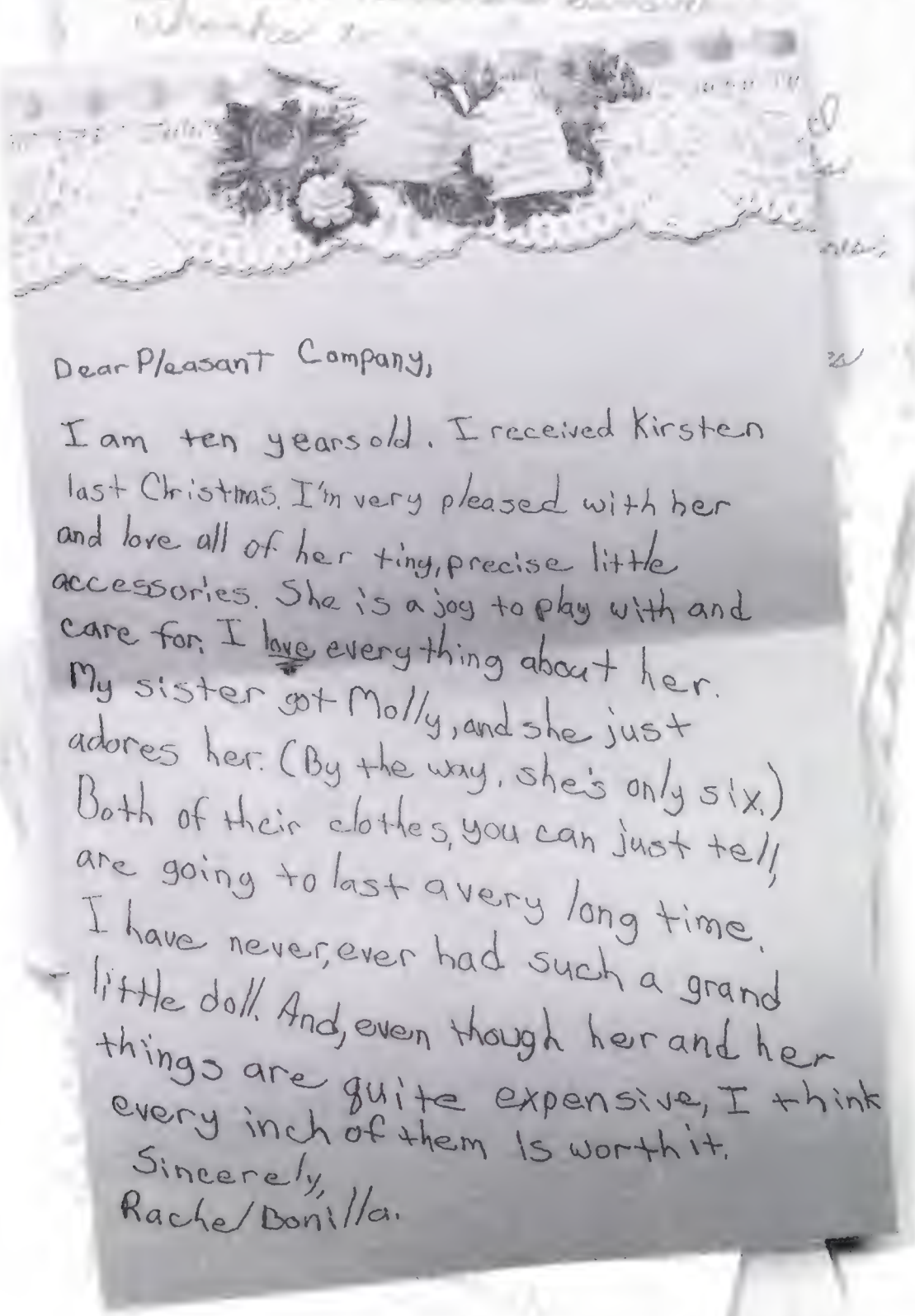

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thought that up all by himself—and how surprised my mother was some 35 years later to find it was first said by none other than Groucho Marx.
Diana Hill
Columbus, Ohio

Dear Sir: Kaplan attributes to Woody Allen the comment on sex "It's the most fun I've ever had without laughing."

Woody may very well have said it; but this quotation or a derivative has been in common use for many years.

I first heard it in Pre-flight School at the University of Georgia in 1945 in the following context: one of the candidates was married on a weekend. On the following Monday, one of his instructors, on learning of the marriage, asked the candidate, "Did you ever think you could have so much fun without laughing?"

Woody Allen is a very funny man, but in this instance, you might just as well credit him with the saying "Have a nice day."
Russ Huber
Pinehurst, North Carolina

Guam rails

Dear Sir: Your article called to mind a morning in the early 1960s—when I was doing nature pieces for the old *New York Herald Tribune*. As I sipped my coffee, the phone rang. "What do *you* know about nenes?" a voice barked. I had written a piece about a pair of these geese, ensconced in the Philadelphia Zoo, saying they were the only captive specimens in the continental United States. "Wrong," snapped Dillon Ripley, who had just read my article. "I have a pair on my farm in Connecticut." He then gave me a 20-minute lecture on writing about flora and fauna. His irate remarks guided my journalistic efforts for a long time thereafter.
Ellison W. Smith
West Lafayette, Indiana

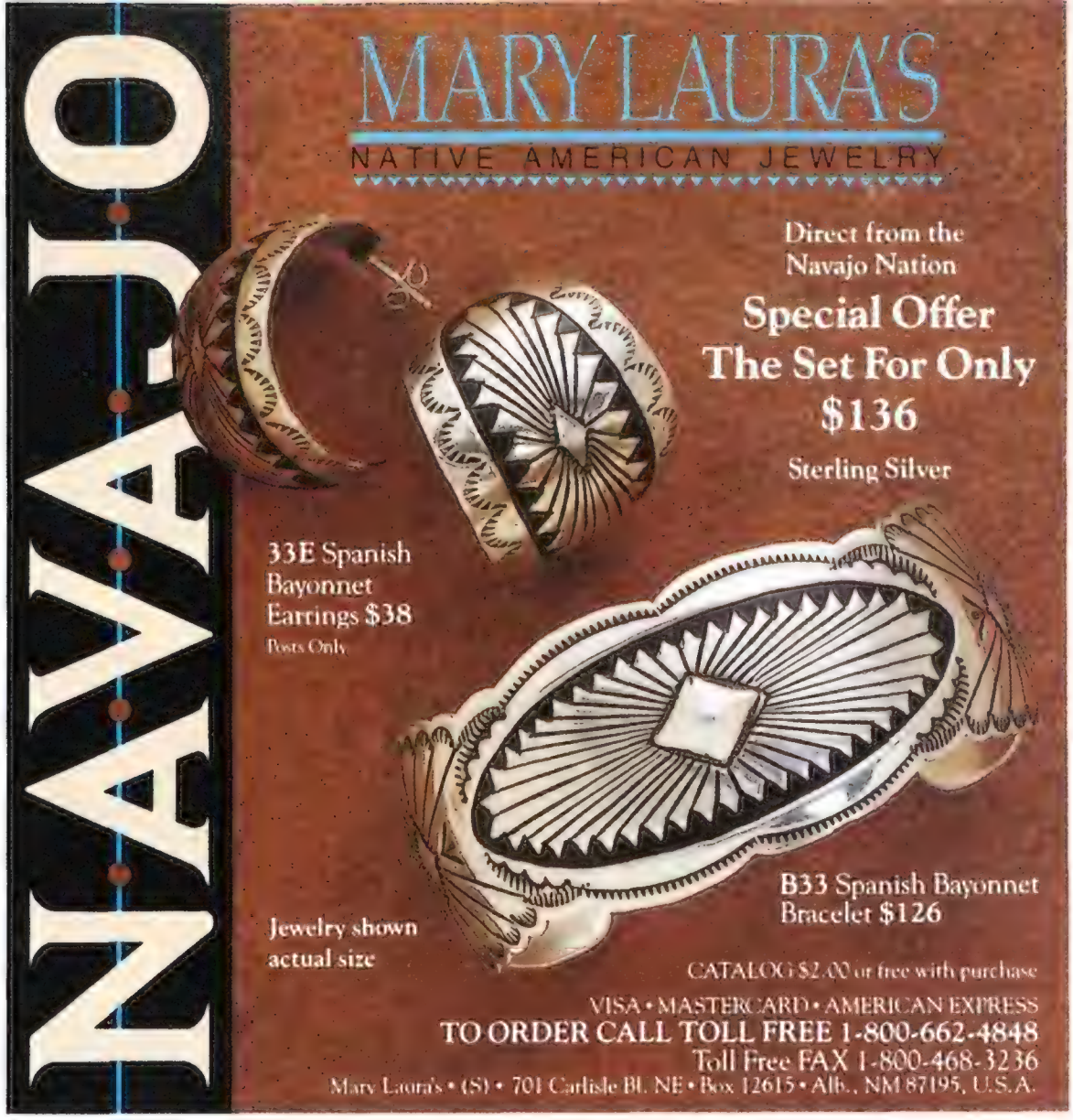
Dear Sir: During the entire time I was stationed on Guam in World War II, I never saw a snake. To the best of my knowledge, neither did any of the thousands of servicemen and the Chamorros who worked with us. I find it difficult to accept the view that the brown tree snake was brought to Guam on military shipments during World War II. Nearly all, if not all, military cargo ships came directly from U.S. ports.

However, not long after the war

ended, the U.S. Naval Supply Center on Guam began accepting shipments of excess supplies from other Navy bases throughout the Pacific theater. Is it not possible that some of these ships may have unloaded cargo with stowaway snakes as early as 1946? During that period, all military personnel were anxious to return home, so incoming cargo was dumped at the supply center with only a cursory inspection.
Joseph O. Balogh
Lake Oswego, Oregon
Wildlife experts on Guam speculate that Japanese ships might well have brought the snake between 1941 and 1944. Or it could have been U.S. ships after the war. Ed.

Dear Sir: Having lived on Guam in the early 1960s, I am wondering whether the predacious tree snake might also have eradicated the island's older infestation of snails and shrews. According to local lore, snails were introduced as a food source, and then shrews were brought in to control the number of snails, which quickly got out of hand. When I was there, the two species were coexisting in enormous numbers. The frequent spectacle of great droves of snails crossing the road was a caution against tampering with things only slightly understood.
James Eason
Forest Park, Georgia
Guam's Division of Aquatic and Wildlife Resources tells us one good thing the brown tree snake has done is to bring the shrews under control. It does not eat snails. However, a predatory flatworm has wiped out all the introduced snails and caused big problems with native tree snails. Ed.

Dear Sir: While I applaud Mr. Ripley's concern for the Guam rail, releasing it on Rota and possibly on Pagan in the future concerns me. What other creature's niche will the rails take? Will they just be a problem, like the walking catfish in Florida, or a true disaster, like the cattle egret in Hawaii?
Mark Kuhn
Bryans Road, Maryland
Our consultant on Guam tells us the rail should not cause trouble. As required by the U.S. Fish and Wildlife Service, before releasing the rails on Rota, the Guam Division of Aquatic and Wildlife Resources took part in an Environmental Assessment (EA) and acquired an exemption from federal law, which usually prohibits introduc-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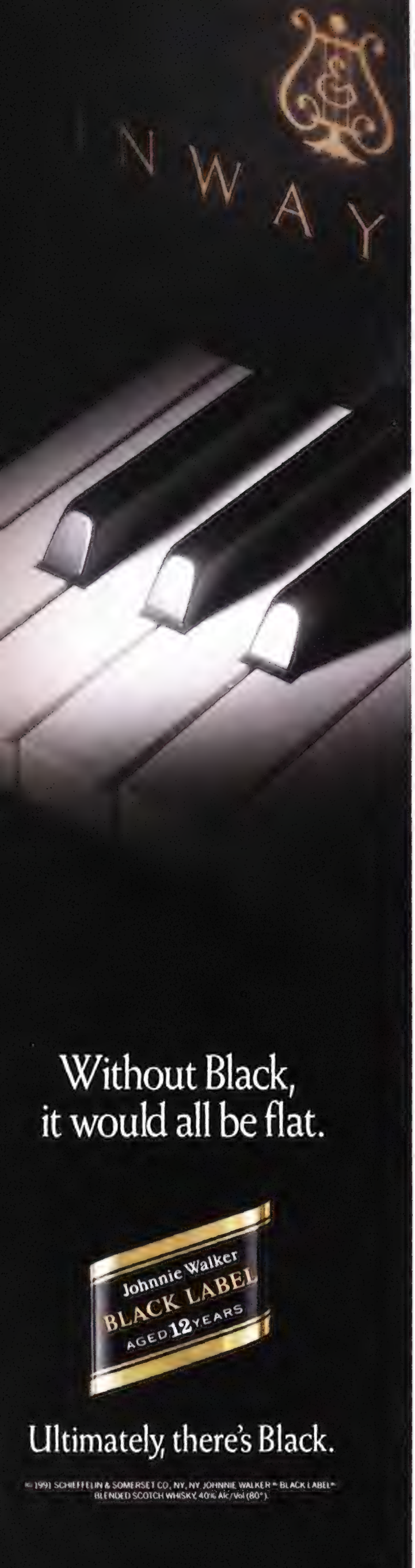
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ing animals anywhere outside their natural range. The habitat of Rota is very similar to Guam's. No other rails or eco-equivalents to the Guam rail live there. The EA included a feeding survey, which found that no reptiles, such as skinks or geckos, or insects would be adversely affected by the rail. Ed.

Dear Sir: Has anyone suggested thinning out the snakes by bringing in the mongoose? Should it work, the next question would be controlling the mongoose.
Walter T. Stevenson
Pittsburg, Kansas
And the next: What will control the controller of the mongoose? Ed.

Green Bay Packers

Dear Sir: Your recent story about Packerland is, without question, the most important assemblage of words in the history of literature. Anyone who does not yet recognize this is either totally deranged, or a Bears fan.
Mike Beno
McHenry, Illinois
Verily, the fanaticism of the Packerite (below) knoweth no bounds. Ed.

Dear Sir: Johnny Blood [né McNally] lived in New Richmond, Wisconsin (pop. 500), where I grew up. His family owned the flour mill, the town's largest industry, and during the summer Johnny often worked there, helping throw 50-pound bags of flour onto trucks. One day the crew, including my brother, filled the bags Johnny was to lift with wet cement! He couldn't budge them. You can imagine how much the fellows enjoyed that little joke.

His sister was my history teacher; his brother, author William Rand McNally.
Dorothy Eggers
Los Angeles

Dear Sir: The Packers are special to our family. My father, a Green Bay businessman, was a Packer Backer from the '20s, a season ticket holder and an early stockholder. His four grandchildren, following in his footsteps, enjoy his season tickets and have his stock, transferred to them by me.

I'm sure they'll pass it all on to *my* grandchildren.
Ann Stender
Madison, Wisconsin

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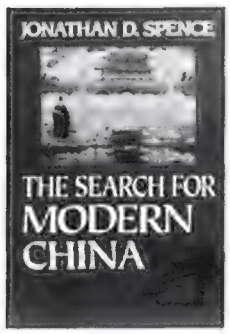

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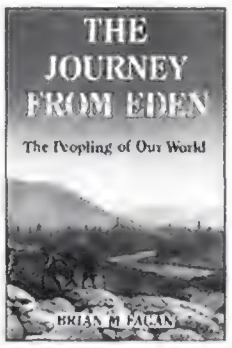

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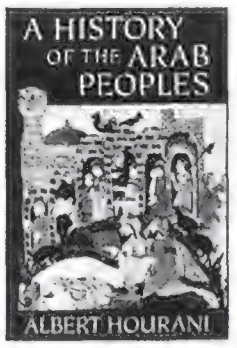

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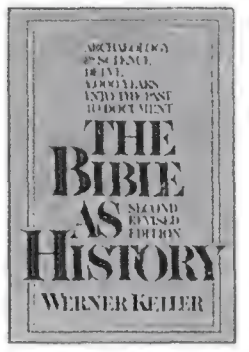

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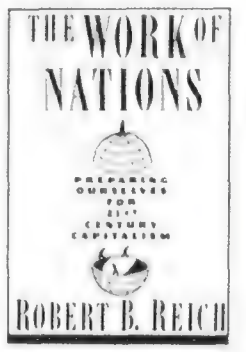

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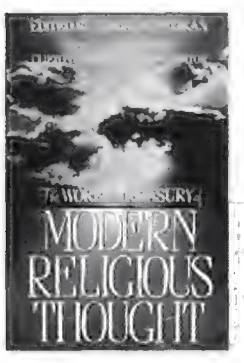

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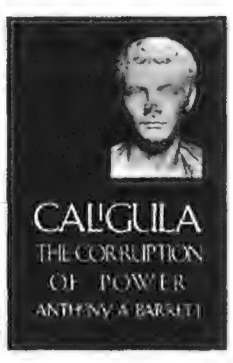

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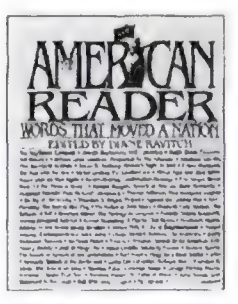

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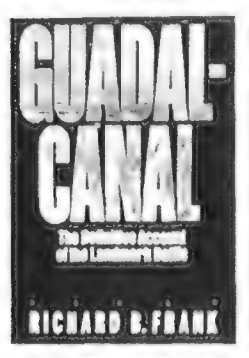

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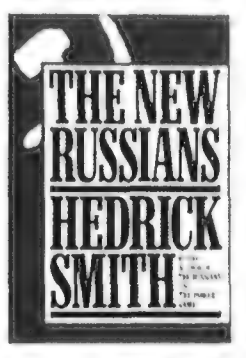

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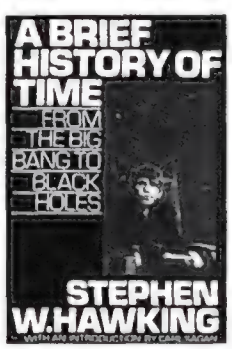

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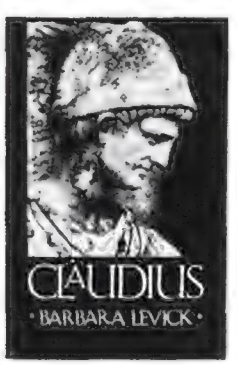

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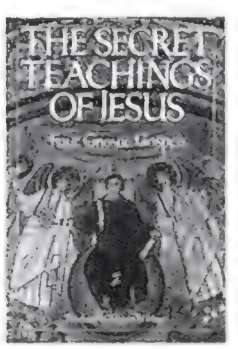

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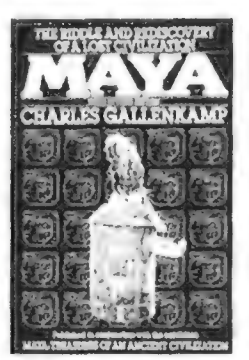

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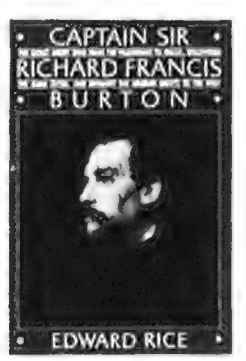

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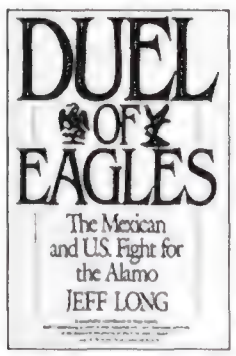

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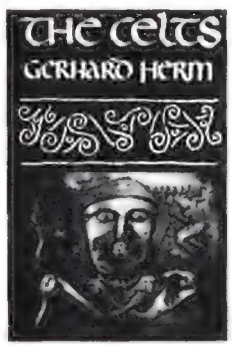

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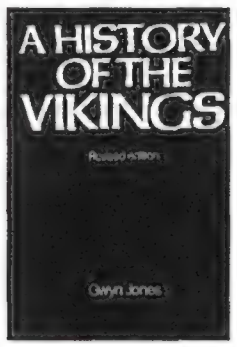

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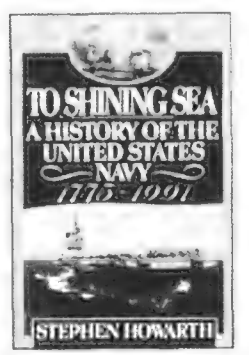

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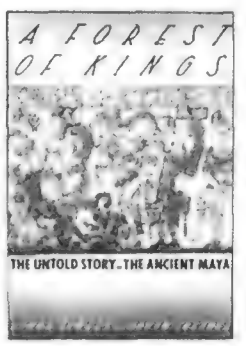

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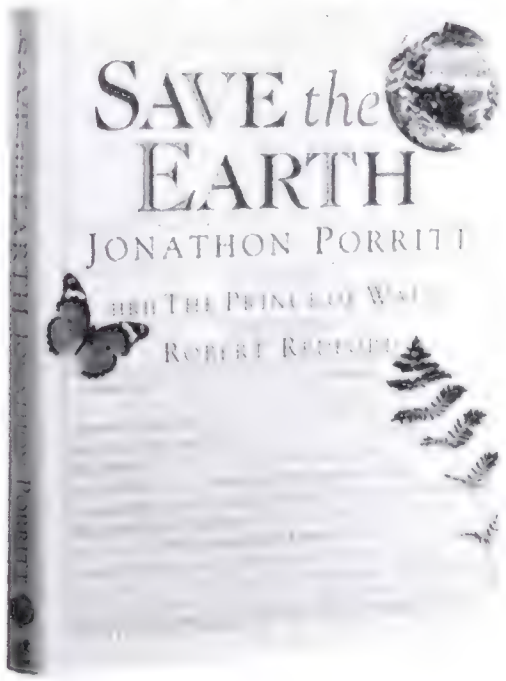

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Around the Mall and beyond

At sea, he's been bitten by a shark, nearly smashed by the fluke of a whale and tossed overboard in a roaring gale. And on land, he's rock-climbed on towering, hard sandstone cliffs near Cape Town, South Africa. What in the world is he doing at the quiet, workaday old Smithsonian, where such hairbreadth escapades may be dutifully recorded and sealed away—but not generally practiced?

This adventurer is Frank H. Talbot, director of the National Museum of Natural History (NMNH), where indeed the fieldwork can often get pretty exciting. Talbot is a marine biologist renowned on three continents, an experienced museum administrator, a distinguished university professor. He's also gifted with a knack for attracting—and fortunately surviving—adventures. They zero in on him like homing pigeons.

In a perverse way, he likes these episodes of peril and self-testing. "I've always enjoyed going to the borders," he told me, "popping my nose out, then darting back to safety. But I don't do it so much now."

I met Talbot in his museum director's office—a spacious Edwardian room overlooking the Mall. He was pacing its length, cradling a phone on an extra-long cord, talking animatedly and decisively while giving me a welcoming wave with one hand. When finally I got him to myself, I faced a trim man with a trim beard that half-conceals a weather-beaten face. The eyes squint a bit—like a pilot's—but gleam with enthusiasm. The grin flashes momentarily. I've seen that face before—and still can't recall its owner: David Niven? William Faulkner? James Bond?

Frank Talbot was born and educated in South Africa. An avid fisherman from the earliest, bent-pin days of childhood, he slid naturally into marine biology. At age 24, just married, he was working for a doctorate on coral reef fishes at a research lab on the island of Zanzibar when that shark got a piece of him.

"I was on a research vessel, checking the population of fishes on the reef by laying trammel nets at night. Often we caught sharks along with the reef fishes, but usually they'd die because they need to move in order to breathe. But some bottom-dwelling sharks can pump water, and so stay alive while motionless. One of these, a four-footer, came free as I was in the water, clearing the net. I felt this bump on my chest."

He thought a helper had accidentally kicked him, then realized he'd lost a patch of flesh off the right side of his chest. "There was no pain at first," he says, "but I hadn't been married very long and I was worried about what my wife, Sue, would say. The ship's engineer swabbed the gash with disinfectant, stuck a towel on it, and I held it there until I could get sewed up. I lost my right nipple." He admits, with a rueful grin, that from then on, old cronies have given him a slightly vulgar nickname.

As a small but avid angler in Cape Town, Talbot used to bring some of the fishes he caught to the South African Museum, where a nice, friendly man would identify them for him. The man turned out to be the director. Years later, Talbot would return to the same museum, this time as chairman of the department of marine biology, and his old mentor would become his good friend and colleague. Talbot loved it—the hundreds of ingenious ways of teach-

NMNH director Frank H. Talbot is caught in a rare moment of repose.

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ing visitors who came to stare at treasures.

In 1964 he moved on to the Australian Museum in Sydney, where he was made director. He and Sue also became Australian citizens. He lived there long enough to give his gently lilting South African accent a dash of high-class "strine." And it was off Australia that he got into some serious sailing.

The Talbot family had always sailed—first around the coral reefs off Zanzibar in an 18-foot sloop, where "our tiny daughter used to lie in a fishing basket, swinging on a nail, as we scudded along in that absolutely predictable trade wind. Sometimes a wave would splash a little over the bow and drip down on her. And she'd crow with delight and lick her fingers." That was Helen. With their next boat, a 30-foot Arab fishing dhow, they tried longer voyages. Now a son, Richard, came along.

In Sydney, they got hold of a sloop built on a Herreshoff design, and sailed up and down the sometimes rowdy Australian coastal waters. It was in a 36-footer that the family, with another son, Jonathan, braved the Tasman Sea (with its reputation for wild storms) to Lord Howe Island. "It has the world's southernmost coral reef," Talbot explains. "Of course we had to explore that." (Sailing is not merely their pleasure. He and Sue, also a marine biologist, need transportation out to their fields of study—the coral reefs.)

One day, in a light breeze, the Talbots' sloop was slowly slipping along, the kids diving off the bow and then grabbing a stern ladder to reboard, when Jonathan, at the helm, said quietly, "Dad, there's a whale."

"It was a humpback, coming slowly on a collision course," Talbot recalls. "I suppose it was half asleep, and had turned off its sonar system. Anyway, the sound we made, rippling along under sail alone, wasn't enough to alert it. We tried to elude it, but it kept coming nearer. When it woke and realized we were in its path, it dove. It vented its gut, staining the water, and one of its flukes barely missed our stern. If it had struck us, we'd probably have sunk."

This boat was wooden. Significantly, the next vessel was steel, built to Talbot's specifications. After all, what can happen to you in an all-steel, 42-foot cruising sailboat? The safety odds were so good that Talbot, having by then become a professor at Australia's Macquarie University, took a sabbatical and with Sue and his youngest son, Neil (known as Nick), headed out. They sailed up the Great Barrier Reef, through the Coral Sea and Torres Strait, and around the top of Australia, threading through reefs and islands to Darwin.

"A glorious trip! A time to dream, to read, to write. Roaring along all day with strong trades, anchoring behind an island at night to go ashore and explore, then back aboard to sleep in peace." Once, after sailing into a quiet cove at dusk, the family woke to find themselves surrounded by big coral heads, reaching almost to the surface. With typical Talbot luck, they'd unwittingly avoided them the night before. Now they had to get past these *bomboras*, or "bommies," as Australians call them, on their way out.

"Nick went up the mast to spot them and pilot us out," Talbot says. "But we were seeing them everywhere, and calling up to Nick to make sure he saw them too. Finally he shouted down,

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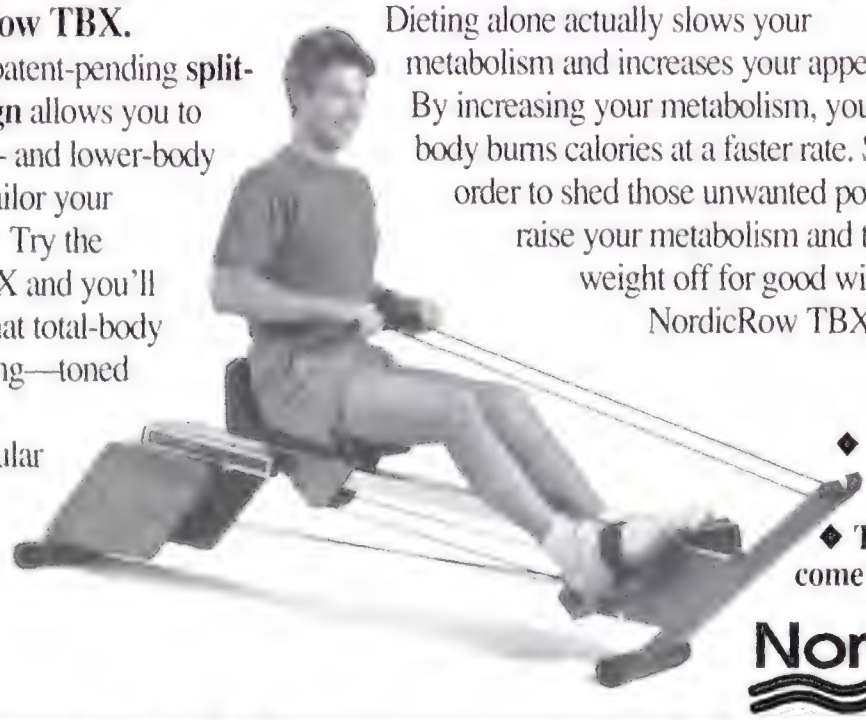

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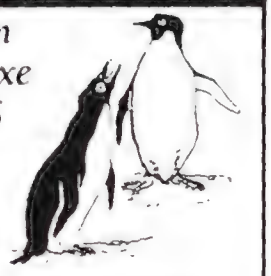

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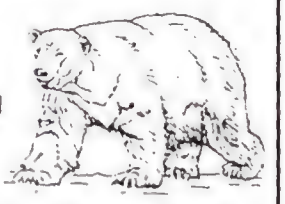

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'Dad! One bommie at a time!' And since then, that's become a family saying when problems crop up."

They proceeded to sail all the way across the tropical Indian Ocean to Cape Town, breaking the long voyage at Mauritius. Frank taught a course at his old University of Cape Town. And then it was home to Sydney again, rolling across the Southern Ocean that burgeoned with life—whales, changing bird populations—still an ocean wilderness when they went through it, now threatened by overfishing. They suffered one heavy three-day gale. "It was like being in the mountains. From the peaks of the waves you could look down into gray valleys and see albatross skimming the water below you."

They reached the southern Australian port of Adelaide, and Nick jumped ship to go to school, his mother leaving with him. Jonathan, the middle son, came aboard to help his dad. Ivan Cavet, a young sailor who could always be lured back to sea for a voyage with the Talbots, filled out the crew. Thus manned, they headed eastward to brave notorious Bass Strait, which separates Tasmania from the Australian mainland, and veer north for Sydney.

"Bass Strait was bad, as usual. A heavy gale hurled us downwind very fast—too fast. Waves built up. Jonathan, at the helm, kept her from broaching once, twice, and then a giant wave slewed her sideways, and over she went."

The two Talbots were suddenly in the water, being towed by their safety harnesses at breakneck speed. After righting itself, the boat continued to plunge downwind, out of control. Ivan, caught below, fought his way to the deck through a couple of tons of water in the cabin. He got the one sail, the Genoa, down.

Jonathan, strong as an ox, hauled himself aboard. "Then they got me back on deck," says Frank. "I couldn't have done it alone." With surprisingly little damage, they hurtled on through the strait and on course for Sydney.

Talbot was lured to the States in 1982 to become director of the California Academy of Sciences. The NMNH got him from there. Among his priorities: starting up *Natural History Quest*, a bulletin to inform more people about the depth and variety of the work of this venerable museum. "I'm tired of people calling it 'the one with the elephant.' We need to offer straight, honest infor-

mation, to document natural history happenings around the world, to build a vigorous image of this museum." That project, guided by Laura Kennedy, is under way, and subscriptions for 1992 are available.

Plans for a new Gem Hall were already being made when Talbot moved into the director's office, but he watches progress keenly, anxious—as is the mineral sciences department—to raise the needed funds and get the job done. I took a look at that project with geologist Jeffrey Post.

"The new hall will occupy roughly the same space that the Geology, Mineral and Gem halls now have," said Jeff, "but the Hope Diamond will be moved right up front where people can reach it first—it'll be properly enshrined. We want them impressed right away. The other minerals and crystals will snare the interest of those who can take the time to explore what we have to offer."

Ideas abound: breaking apart a car or TV set to show the mineral resources that went into it; showing a diamond being built; passing visitors through a mine; offering an interactive TV to show how Earth looked millions of years ago, and how it will look millions of years from now; setting up a "shake table" for visitors to feel the effect of an earthquake. "We'll demonstrate plate tectonics graphically," said Jeff, "and tie Earth's movements in with the pattern of volcanoes around the world."

Money is the catch. The museum is trying to raise $6 million, and "interest in the exhibitions seems high." A lot of people are intrigued by the prospect of a Smithsonian minerals exhibit that, for decades to come, will point the way for other museums.

Certainly Frank Talbot is cheering the project on toward a possible opening in early 1995. But to him, the new Gem Hall is only one of a host of challenges that face him at NMNH.

Nowadays, he has few chances for sailing, although he's "flirting with a big catamaran that would serve for research." And he still finds rejuvenation in the wild places. Not the sea, now, so much as the hills where trout lurk in the brooks and birds call in the woods.

He doesn't "go to the borders" anymore. He has enough problems at the museum to suit anybody. But he knows how to handle them. It's a case of "one bommie at a time."

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Phenomena, comment and notes

Albert Koch could find fossils as well as any man alive, but he got a little carried away when he assembled them

Albert Koch had spent a miserable winter in 1840, racked by bouts of fever brought on by weeks of digging in mud and wading in stagnant swamps. His strength and stamina had deteriorated, yet he felt a familiar surge of energy when a messenger brought news of remarkable fossils. Giant bones had been unearthed by a farmer in Benton County, Missouri, more than 200 miles from Koch's St. Louis home.

In less than 24 hours he was aboard a Missouri River steamer, heading upstream to a rumor. The six-day river trip was agony, not so much from the discomfort of his fever as from the fear that souvenir hunters might vandalize the site before his arrival.

For years Koch, a self-taught naturalist and avid bone hunter, had searched in vain for the treasure that would transform his museum, a three-story building at the site where the Gateway Arch now stands, from a modest repository of curiosities to a natural history center of world renown. To be sure, patrons were supporting the museum's exhibits and programs. Visitors could examine live alligators and bears, stuffed birds, wax figures, historical dioramas, large fossil collections, and more. The attractions were supplemented by entertainers: magicians, ventriloquists, musicians and dancers.

All was trifling compared with the exhibit that had obsessed Koch for years. He had amassed a collection of immense fossils: dozens of leg bones as thick as tree trunks, scores of teeth larger than a man's fist, a roomful of skulls too large for a person to lift. Koch identified these remains as belonging to the mysterious *Incognitum*, a creature unlike anything known to the Missouri settlers. Some believed the bones belonged to a race of giant men entombed by the Noachian deluge. Others repeated native-American legends of a huge carnivorous monster.

We now know that most of Koch's unidentified bones belonged to the American mastodon, an extinct cousin of today's elephants that populated much of North America for more than three million years.

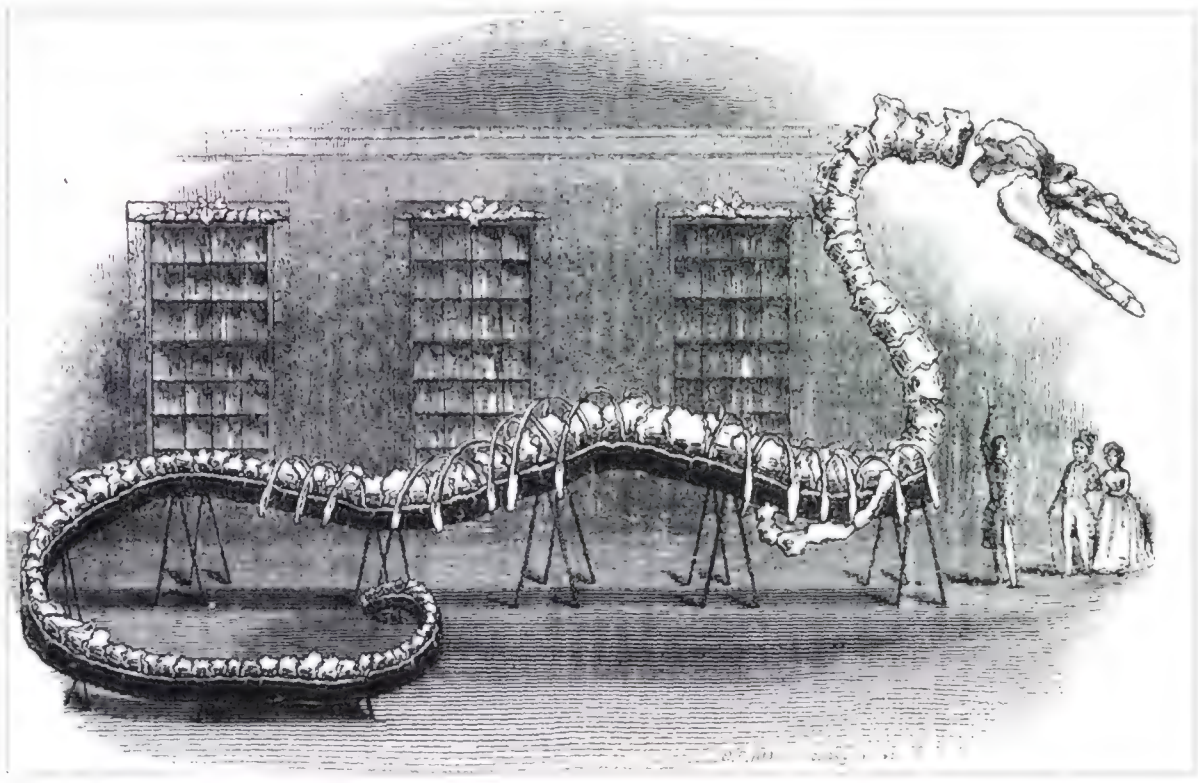
The arrival of human hunters, coupled with rapid climatic change at the end of the last ice age, probably doomed the animal. The population dwindled rapidly, and the last of the species died about 11,000 years ago. In the early 1800s, Charles Wilson Peale had excavated the near-complete remains of two mastodons. Koch had several hundred fragments, but by the late 1830s no complete skeleton had been found, and the great *Incognitum* still remained a mystery.

The boat carried Koch up the Missouri as far as the Osage River. Several more days of difficult travel, much of it on horseback through thick, virgin forest, led him across the Pomme de Terre River and into a secluded valley. Suddenly, there it was: a rich, untouched fossil site, strewn with bones.

Koch established a base camp at the farmer's log cabin. The work proceeded through April and May, rewarded by a growing pile of bones but no complete animal. Then came the breakthrough: a giant skull with an extraordinary tusk, more than 15 feet long, still in its socket. A second huge tusk was unearthed, followed by dozens of other bones: ribs more than five feet long, vertebrae a foot across. Koch was amazed to discover several beautifully formed flint arrowheads among the bones—apparent proof that humans had coexisted with the creature. Two more months of careful excavation were needed to finish.

Koch had hoped to float the exhumed beast down the Pomme de Terre and thence by the Osage and Missouri rivers to his museum. By midsummer, however, the river had dried to a mere trickle. Three wagons drawn by four oxen each were enlisted. Koch modified the rough-riding wagons with an ingenious suspension system: flexible oak trees were secured to the sides of each wagon, and the carefully boxed bones were suspended from these supple, springlike supports. The improbable caravan crawled 50 miles north over the rolling hills of central Missouri to Boonville, where a steamboat down the Missouri completed the adventure.

Museum patrons did not have long to wait. In less than a month, Koch unveiled the creature that he called *Missourium*, although newspapermen, astonished by its unprecedented size, quickly adopted the name "Missouri



The 114-foot "great sea serpent" assembled by Albert Koch was actually composed of fossil bones of the whale *Basilosaurus*, which grew to 70 feet.

Leviathan." Koch had blended his love of nature with showmanship and concocted a beast of mythic proportions. The mounted skeleton, much larger than any mastodon, was 32 feet long and 15 feet high. St. Louis residents flocked to see the wonder. Koch was so encouraged that he sold the museum and started on a national tour with his fabulous fossils.

Reconstruction of extinct animals from their fossil bones is a challenging art and exacting science. Fossil skeletons almost never survive intact. The bones of one animal may be scattered far and wide by scavengers and water. Fragments of several animals may come to rest in the same streambed or sandbar. As a result, paleontologists must spend years studying the skeletons of living animals, documenting form and function and comparing anatomical details of related creatures before attempting to assemble a museum display.

Koch had no such training. His success as a collector was far greater than his skill as an anatomist, and the restored skeleton was as much a product of Koch's imagination as of nature's design. The first reaction by scientists to the Koch restoration came late in 1841, during an exhibition at Philadelphia's Masonic Hall. The experts praised Koch for his perseverence in acquiring the fossils but were quick to note "some errors in the articulation of the bones." Though not out to defraud the public, Koch had let his imagination

The Smithsonian's *Basilosaurus* was collected from Koch's Alabama site.

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run away with him. He had added at least ten extra vertebrae, as well as thick spacers next to each vertebra, thus greatly increasing the length and height of the animal. Two extra ribs were used as collarbones, and each foot had several long, slender digits, further obscuring the beast's mastodon identity. As a final touch, the two curved tusks were mounted so as to project backward over the skull, rather than forward as in most elephantine fossils.

Undaunted by the criticism, Koch took his showpiece to London and the Continent, where American curiosities were viewed with special interest. He found an eager market for his fossils at several major museums. The complete *Missourium* was bought by the British Museum for £1,300.

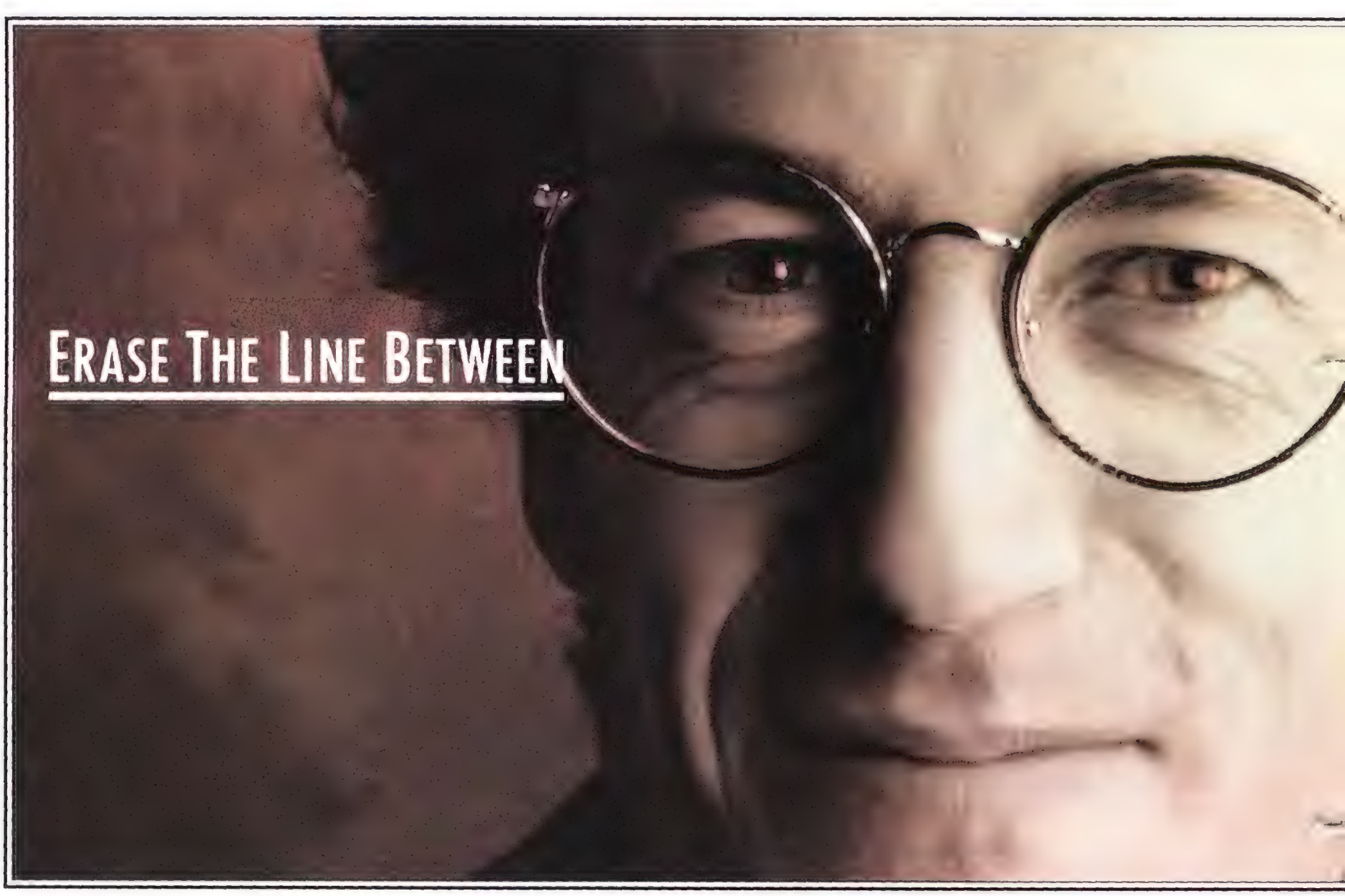
Koch celebrated his successes by awarding himself the title "Doctor" and returned to the United States with renewed enthusiasm. His most spectacular discovery was still to come. Fragmentary remains of a large aquatic vertebrate had been known for more than a decade from riverbanks in the southeastern United States. The exact nature of this whalelike animal was uncertain, although the names *Basilosaurus* (emperor lizard) or *Zeuglodon* (yoke tooth) were used in the scientific literature. Koch was determined to discover a complete specimen.

In January 1845 he traveled to Mobile, Alabama, and thence up the Alabama River. He kept stumbling across evidence of truly immense animals that had inhabited the shallow seas that once covered the area. Giant fossil vertebrae weighing more than 50 pounds were common curios: one was in use as a doorstop, a pair as andirons, and yet another as a pillow for a slave. Each time he saw one, Koch would ask where it had been found. Gradually word of his search spread, and in March he was told of a 90-foot "fossil shark" in Washington County, 40 miles north of Mobile.

Koch wasted no time. He gathered his equipment, borrowed a horse and set off to the small community of Washington-Old Courthouse. Inquiries turned up nothing. The first night he slept only fitfully. The next morning two young boys presented themselves and offered to take the agitated collector to the exact spot, a woodless slope near the Tombigbee River. There Koch found a colossal array of bones, mostly embedded in limestone and lying, still somewhat in order, in a great semicircle.

A month of excavation followed, and Koch was rewarded by a nearly complete skeleton of what could only be described as a sea serpent, with massive, tooth-lined upper and lower jaws, dozens of giant vertebrae and man-size ribs. To these specimens he added numerous other bones from the nearby hillsides and stream banks. A jubilant Koch crated his finds and arranged to have them transported by ship around the coast to New York, while he traveled inland. After a monthlong journey from New Orleans up the Mississippi to St. Louis and from there to the East Coast, Koch received devastating news. The cargo ship had been wrecked off the Florida coast.

For a week Koch mourned the loss of a scientific treasure—and then came astonishing news: salvagers had managed to retrieve the crates of fossils before the ship sank. And rather than selling what they had saved, they sent the fossils



on to Koch in New York at no charge.

Throughout the summer of 1845 Koch unpacked, cleaned and mounted the monster's bones. He was not one to let a good vertebra go to waste. Longer and longer his monster grew, until he had created the largest skeleton ever assembled. The composite "sea serpent," dubbed *Hydrargos* by Koch, was 114 feet long when it was unveiled in New York. Public and press were stunned; citizens flocked to examine the spectacle.

The scientific community, which had seen Koch's concoctions before, was not overly impressed. Reputable scientists noted the use of vertebrae from at least three individuals of different species and denounced Koch's interpretation of his find. They said *Hydrargos* was actually a distorted *Basilosaurus*.

Scientists today consider *Basilosaurus* a whale. Measuring more than 50 feet in length, it was probably an inshore animal. Its prominent eyes, rows of sharp teeth and powerful, streamlined body suggest a hunter that subsisted on fish and other vertebrates, much like today's killer whale. *Basilosaurus* has been much in the news lately, with the discovery of remains in the Egyptian desert that offer the best evidence to date of well-formed hind limbs, complete right down to the toes. Koch's "sea serpent" thus represents a remarkable transitional form in the evolution from land mammals to modern cetaceans.

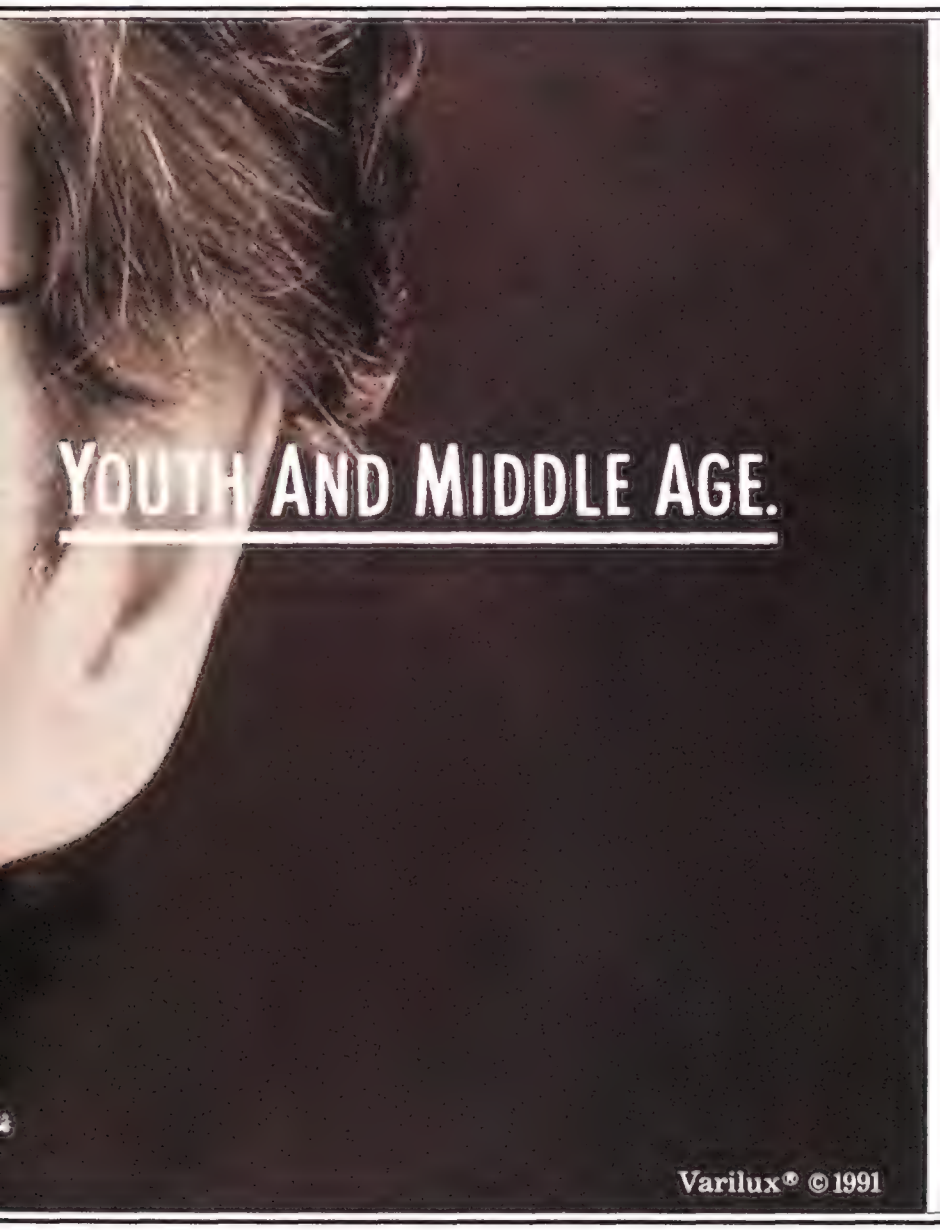
Once again Koch was unconvinced by the criticism, and once again he took his find to Europe, where the German scientific community, especially, showed enthusiastic interest. In Berlin he was honored with a yearly pension, and the great fossil was purchased by Friedrich Wilhelm IV, King of Prussia.

Inspired by more success, Koch exhumed a second complete *Hydrargos* in February 1848. This 96-foot creation, though considerably shorter than his previous one, again excited audiences, first in Europe and then in the United States. For a third time Koch achieved both public acclaim and financial reward. Only in the mid-1850s, in the sixth decade of his life, did Albert Koch give up his quests and settle down to a somewhat more sedate life of academics and business in St. Louis.

The art of collecting and preserving fossils requires skill, perseverence, occasional hardship and more than a bit of luck. Koch was one of the most successful bone hunters of his generation. Few paleontologists have ever matched his ability to sniff out a thigh bone or a tooth, and few collectors have been so successful at supporting their passion through showmanship and sales.

But collecting skill is only half the equation. Like any other scientist, the fossil expert must analyze and interpret his data (in this case, the bones) after they are collected. The identification and display of fossils requires specialized knowledge of morphology and comparative anatomy. Koch lacked such expertise. He acted more like a P. T. Barnum than like a reputable scientist. Whether his fanciful fossils represented conscious fraud or merely misguided enthusiasm will never be known for sure. Nevertheless, he can still be esteemed as one of America's most successful collectors of extraordinary fossil treasures.

Robert M. Hazen
Robinson Professor, George Mason University; research scientist, Carnegie Institution of Washington



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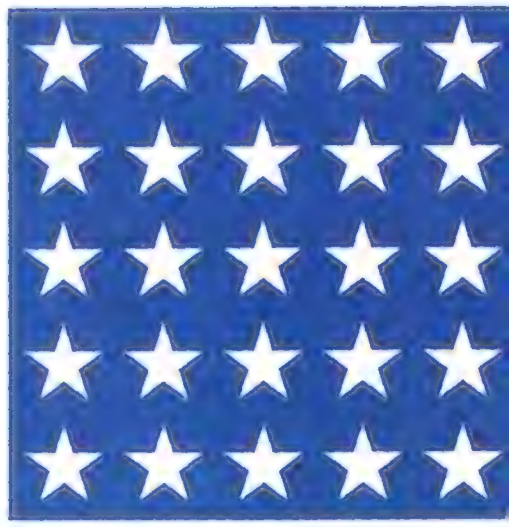

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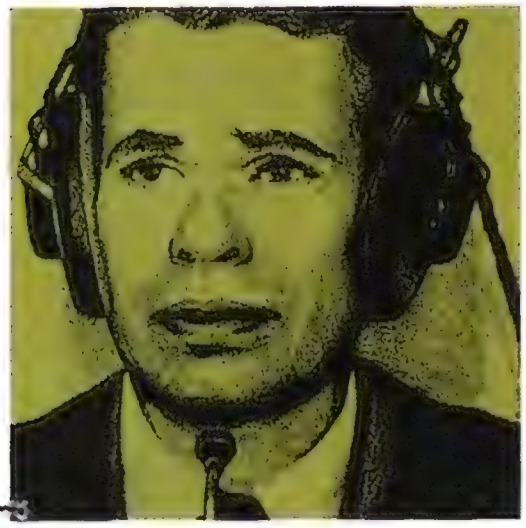

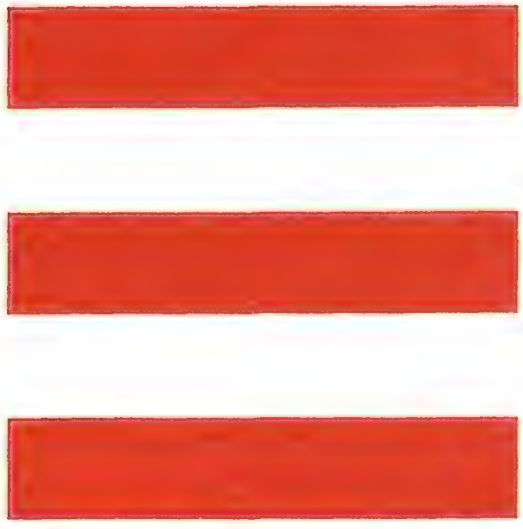

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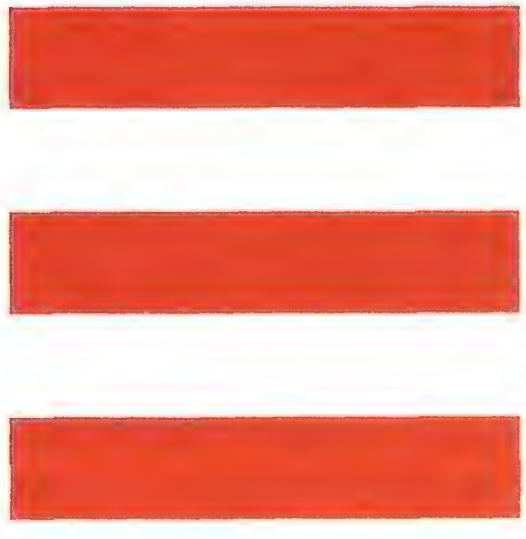


"Duke" Ellington wrote some of the most fascinating music the world has ever heard

Beyond the elevator (left) and ventilator, the stack of the *S. T. Crapo* gleams in the early-evening sunlight.

The *Crapo*, a 400-foot-long cement carrier, departs Muskegon, Michigan, after dropping off half her cargo and heads for Milwaukee. The sturdy steamboat has been a renowned workhorse since her 1927 launching.

Article and photographs by David Plowden

The last of the old 'lakers' are steaming off into history

They've been hauling cargo across the Great Lakes for more than a century, but now only a few classic steamboats are in service

I cannot imagine a world without steamboats and the sound of steamboat whistles. My love for these vessels began when, as a very little boy, I used to sit by the window of my bedroom looking out on New York City's East River. There was hardly a moment when a steamboat of some sort wasn't in sight. By the time I graduated from college in the mid-1950s, however, the age of steam was nearly over. The coal-burning steam locomotive had been replaced by the diesel engine, and a similar fate lay in store for the classic steamboat.

Today time is running out on the last survivors, several of which ply the waters of Lake Michigan, just a few blocks from my home in Winnetka, Illinois, a northern suburb of Chicago. A few years ago I found myself pacing the beach at the nearby town of Waukegan, awaiting the arrival of one of them—a freighter named the *J. B. Ford*. For the better part of an hour I scanned the empty horizon for a sign of her. Then suddenly there she was, an apparition suspended between water and sky.

As I contemplated the *Ford*'s unhurried approach, I felt as if I were watching an old movie. She was an anachronism, one of the most venerable steamboats in the world, and she had all of the hallmarks: towering funnel, deep whistle, straight stem, counter stern and,

Charts of the Great Lakes cover the table in the pilothouse of the steamer *Kinsman Independent (2)*; an old grain carrier, she was scrapped in 1988.

deep within her riveted steel hull, a staunch piston engine keeping the stride. Launched in 1904 at the American Ship Building Company's yards in Lorain, Ohio, she was laying down a pall of coal smoke over the Great Lakes when the immense express liners of the North Atlantic were racing one another for the coveted Blue Riband. She was hauling iron ore from the Mesabi Range in Minnesota during World War I, when the battleships of the Royal Navy were steaming toward Jutland, and again in World War II, when our own fleet was steaming toward the Coral Sea. Now here she was, rounding into port at Waukegan long after most of her contemporaries had been scrapped, or as a steamboatman would put it, "turned into razor blades."

Passenger service on vintage steamboats is virtually nonexistent in the United States today, available only on a few Lake Michigan car ferries when they are operating, or the historic stern-wheeler *Delta Queen* for overnight cruises and a few excursion boats scattered around the country. Detroit, Seattle and Mystic, Connecticut, are some of the places where you can still take a short ride on an old steamboat. Steam cargo vessels have also just about disappeared from our waterways. The only place in North America where a fleet of old-fashioned cargo steamboats is to be found in regular commercial operation is the Great Lakes region.

The carriers that steam across these inland seas are called "lakers." As the name implies, they are products of their particular place. They bear no resemblance to the diminutive sidewheelers that still churn up and down the rivers and lakes of Europe, or to the sleek, steam-powered excursion vessels that were for so many years the pride of the Hudson River Day Line. Unlike the overnight packets that once called at every port from Boston to Seattle, lakers seldom display carved staircases and elegantly appointed rooms. They have little in common with the illustrious transatlantic liners of my parents' and grandparents' time.

Their stock-in-trade is iron ore, coal, cement, limestone, grain, salt, potash and timber. Their haunts are steel mills, coal piers and grain elevators. They look like the workaday carriers they are—mostly hull, huge and plain—yet they have a magisterial bearing few other vessels possess. As the captain of one freighter said to me, "They have line."

The idea behind the laker is simplicity itself: provide maximum cargo space that can be loaded and unloaded as quickly as possible. The result is a boat that has been described as "an island with a house at each end." The prototype, designed and built by Captain Eli Peck of Cleveland, was launched in 1869. The hull of Peck's *R. J. Hackett* was more than 200 feet long, boxy, shallow of draft and wide of beam. It did not have paddle wheels, as did most of the riverboats and sleek passenger steamers of the time. Instead it had a single screw, or propeller, in the middle of the stern, ahead of the rudder. An even more radical departure was the placement of the *Hackett*'s engine—far aft so as to leave as much uninterrupted cargo space as possible. For the same reason, the pilothouse was placed well forward over the point of the bow where the hull was narrowest.

Needless to say, Peck's configuration was a huge success. Quite apart from its function as the ultimate cargo carrier, the laker was designed to withstand tempests and mountainous waves. The violent autumnal storms that blow up on the Great Lakes have caused some of America's worst shipwrecks; one of them, the "Big Storm" of November 1913, sent 11 boats and about 250 men to the bottom of Lakes Huron and Superior.

Peck's design, augmented in 1908 by a conveyor-belt system for unloading, remained basically unchanged for nearly a century. Eventually the Great Lakes bulk cargo fleet numbered in the hundreds, and the vessels grew larger and larger. The first of the 600-footers, a class that was to remain the standard for nearly half a century, was the ore carrier *J. Pierpont Morgan*, built in 1906. As the locks at the Sault Sainte Marie Canals, between Lakes Superior and Huron, were enlarged, the size of the vessels increased. With

Photographer David Plowden's book about the last steamboats will be published in 1992 by W. W. Norton.

the opening of the 1,200-foot-long Poe Lock at the Soo Canals in 1969, the era of the 1,000-footer was at hand.

To many who live by the sea, the idea of huge ships working a thousand miles and more from the ocean is incomprehensible. Those who live on the lakeshores, of course, take the idea entirely for granted. But one thing we all tend to forget is that by the turn of the century the Great Lakes area had become a linchpin of the Industrial Age. To supply the region's voracious appetite for raw materials, and help satisfy the world's appetite for the heartland's agricultural products, steamboats have hauled millions of tons annually across the lakes to and from places like Duluth, Minnesota, and Buffalo, New York; Alpena, Michigan, and Ashtabula, Ohio.

At present most of the hauling is done by enormous carriers built in the 1970s and '80s and powered by immense diesel engines. There are only about 50 steamers in the Great Lakes fleet. Most are powered by turbine engines. Fewer than a dozen are driven by reciprocating engines—and only half of them are in active service. These piston-powered grand old lakers are the last of a dying breed.

That these classic boats have survived this long is due primarily to the fact that fresh water is easier on metal than is salt water. It is less corrosive. Another reason is that lake boats are usually in service only nine months of the year. There is ample time during the winter to lay up for maintenance and repairs, which means owners can uphold a standard of maintenance that keeps vessels operating longer than might otherwise be the case. Finally, speed is not of the essence in the bulk-cargo business. The 10 to 15 miles per hour produced by the reciprocating engine is adequate.

The reciprocating engine is one that converts the up-and-down motion of pistons to the rotary motion of a propeller. The difference between the steam-driven reciprocating engines used in the old lakers and the more advanced diesels and turbines that drive their descendants was once described to me by a steamboatman as the difference between a Ford and a Ferrari—because they're simpler, the "up-and-down" engines are easier to repair and maintain. Parts are scarce, however, and there are fewer and fewer steamboatmen around who know how to fix the machinery.

It may have been primitive, but the steam engine was one of the central forces in the development of Western culture. Although Robert Fulton was the first to successfully apply the new technology on the world's waterways, he relied upon the work of others who came before him. Not the least of those was the Scottish inventor James Watt, who is considered the father of the modern steam engine.

Rivets bond the overlapping steel plates on the hull of an old ore boat.

The term "steamboat" has come to mean a craft used on inland or coastal waters, whereas the term "steamship" generally applies to large oceangoing vessels. At one time all steam-powered vessels burned coal or wood, and all but the smallest were fitted with reciprocating engines of the "expansion" type, in which the steam works successively in several cylinders, rather than in just one. Since the size of the cylinders determined the power of the engines, and since more and more powerful engines were required as the size of the boats increased, the engines thus created were immense. So immense, in fact, that they were often referred to as "cathedrals of metal." They stood several decks high and were held in place by huge steel columns not unlike the buttresses of a medieval cathedral.

After World War II, many an old coal-burner, including the *J. B. Ford*, was converted to oil. By now, hundreds of old lakers have been scrapped. The few that remain are relics of a time when the machines we made often impressed us as being not only important but beautiful as well. It was a time when the men who operated those machines were proud of the skills their hands-on work required. It was a time when you did not simply push a button in order to get something done; you had to know how to do it yourself.

One of the purest of the survivors on the lakes is the *S. T. Crapo* (pronounced KRAY-PO). Her claim to distinction is that she has remained virtually unchanged since the day she was christened, 64 years ago. She still burns coal. She still generates steam in her original boilers. She is still doing the same work for which she was built: hauling cement.

Although I have known the *Crapo* for a long time, it wasn't until recently that I had an opportunity to take a trip on her. It began in Milwaukee a little after 3 o'clock on a midsummer morning. I was happily ensconced in the pilothouse, sipping coffee from a plastic cup and watching the crew make preparations for departure. Captain Howard Fisher, a veteran of 41 years on the lakes, was in command. Due to embark momentarily from a cement plant, we were bound for Alpena, the *Crapo*'s home port. The plant is located at the far end of a shallow, narrow canal that twists its way through Milwaukee's industrial neighborhoods. It was hard to believe that such a large vessel—400 feet long and 60 feet

wide—could somehow have managed to make its way there from Lake Michigan, much less back out in the dark past seven bridges, all of which had to be raised or opened.

At 3:30 the wheelsman arrived. Captain Fisher turned off the lights in the pilothouse and picked up a walkie-talkie. "OK. We're all set up forward," he informed Dave, one of the watchmen. "Send that fellow aft." He was referring to a tugboat, the *Bonnie Selvick*, which would be towing us from astern.

At 3:38 another voice broke in over the walkie-talkie. "Stern lines in," reported Jimmy, the bos'n aft.

"OK, Wendel, she's all yours," Captain Fisher advised the tug captain.

A thin line of coal smoke began to pour from the *Crapo*'s stack. It was 3:39 when the wall of the cement plant started to slip past, and I realized we were under way. Voices of crewmen on walkie-talkies began to inform the captain of the boat's progress.

"About 36 feet off the rudder."

"About 5 on the starboard bow, Cap'n . . . about 3 feet now."

The tug then disappeared in a clump of trees on the bank as the *Crapo* began to negotiate the bend before the first bridge.

"How far are you off, Dave?" the captain asked.

"About 2 feet, Cap'n."

I watched incredulously as the bridge hove into view and we started to pass through the channel between the wooden bridge piers. "I'm not going to be able to help you much, Wendel, so you'll have to be ready," Captain Fisher informed the captain of the tug.

"Are we going to clear, Jimmy?" he asked one of the bos'ns.

"About 2 feet off starboard bow, Cap."

"OK. Real good."

Nobody said a word until we had passed through. "Better blow for the next bridge," the captain told Wendel.

An hour after we left the cement plant, we passed through the last bridge. Speaking to the tug, the captain said, "OK, Wendel, toss her off anytime," referring to the towline.

"OK, Cap."

At 4:55 A.M., the *Crapo* steamed through the breakwater and onto Lake Michigan.

"Kind'a dark mornin'," allowed Bob, the wheelsman now on watch. "She's a little sloppy."

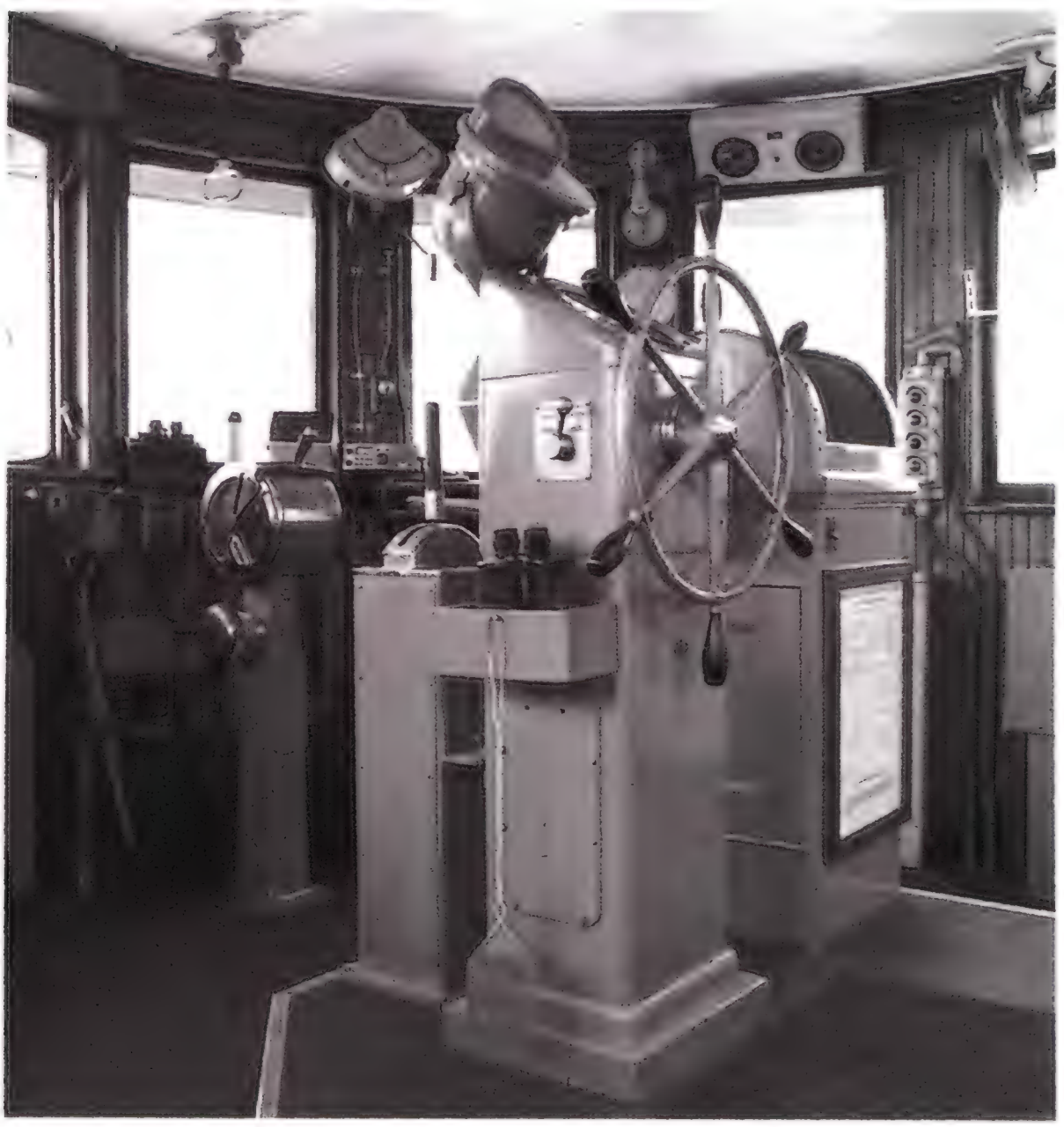
"Can you read Lake Michigan?" Captain Fisher asked the mate Bruce Matthes, referring to the weather fax.

"Yeah, Cap'n," Bruce replied. "Three- to five-foot waves."

"What direction?"

"Doesn't say."

The boat was riding fairly low. When its cargo of cement was unloaded in Milwaukee, water had to be pumped into the ballast tanks around its sides and beneath its hull in order to maintain stability. An empty vessel, or one with little ballast, can make better speed but rides high in the water and therefore is more susceptible to the effects of waves and wind. Captain Fisher had to decide whether to pump out some of the water from the tanks or keep them full. It was a question of speed versus comfort.



Pilothouse of the *Irvin L. Clymer*, now out of service, is dominated by the wheel stand and, at left, the telegraph.

Silence fell again while the captain sized up the lake. It was still dark. The only sound in the pilothouse was the creaking of the wheel as the wheelsman worked it back and forth, and the hum of the gyrocompass. "Make her course left to 32, Bob," Captain Fisher finally said. "Let's see how she rides."

Dawn revealed a monochromatic world where sky and water were indistinguishable. Up in the *Crapo*'s

On one of the *J. B. Ford*'s last trips, the venerable freighter looks sleek despite her 87 years. Today she's used for cement storage.

pilothouse there was no sense of motion at all. The only indication that we were indeed not at rest was the steady throbbing of the engine. The captain finally decided not to pump out the ballast tanks. "Still a little sloppy out here. Besides, we've got a passenger," he said, looking in my direction with a smile.

After a few minutes, Captain Fisher got up from his chair, stretched and started down the stairs leading to his cabin. "See you tomorrow. I'm going to get some sleep."

I poured myself another cup of coffee and took up a place on a stool in front of a window on the opposite side of the cabin from the captain's chair, which was to become my spot for the next three days. The *Crapo*'s pilothouse was small. Sitting there I had the feeling I was in an aerie. We were entirely surrounded by windows. The centerpiece was the wheel stand, a raised, oval platform on which the wheel was located. Directly behind it and a little to the left was the wheelsman's perch. At the front of the stand was the binnacle, a tall brass column housing the magnetic compass. As a general rule, the wheelsman steers using the gyrocompass, which was located just forward and to the left of the wheel. The gyro is an electric compass which, unlike the magnetic compass, gives true North.

The most unique piece of equipment in the pilothouse was the telegraph—known throughout the lakes as the "Chadburn," after the British company that first manufactured it. The captain of a diesel-powered vessel controls the engines directly, but on an old steamer it is the engineer belowdecks who operates the machine. Communication between the two is achieved by means of the telegraph, a device that looks rather like a huge brass alarm clock with a handle on top. The captain moves the handle to indicate on a dial what speed and direction he desires: full ahead, half ahead, full astern, half astern, and so forth. The identical message is repeated on a corresponding dial in the engine room. The engineer then adjusts the controls accordingly.

Side by side with the old technology represented by the Chadburn, the *Crapo*'s pilothouse was crammed full of new technology, too, including two loran programmers, two radarscopes and a depth finder. Adding to the general clutter were a fan, a brass clock, a calendar, three fire extinguishers, two VHF radios, a broom, a flyswatter, a cellular phone and, on top of a two-drawer file cabinet, a coffee maker. At the back of the pilothouse a chart of Lake Michigan was spread out on the chart table. Hanging on the wall at the head of the staircase leading to the captain's bedroom was the *Crapo*'s certificate of inspection, which provided detailed information. Built: River Rouge, Michigan, December 15, 1927. Official number: D226885. Engine: 1,800 horsepower. Tonnage: 4,769 gross and 2,942 net. Length: 392.50 feet. Total number of crew members allowed on board: 40.

The seas had gotten a bit rougher, and all at once we were caught in a trough. "I'll bet that will bring the old man up," said Bob.

It did. In less than a minute Captain Fisher was back in the pilothouse sizing up the situation. "Pull her up a little Bob, so when we get to Point Big Sable we can change to 30. That way we can eat dinner without getting soup in our laps." In a few minutes the *Crapo* was rolling at a steady, even gait through six-foot seas on a new course, heading diagonally toward the Michigan coast.

Time is running short for the last of the old Great Lakes freighters

Captain Fisher settled down in his chair. He sat there silently looking out at the lake for a long time. I knew that he had been thinking about retiring and I wondered, as I watched him, what it must be like after spending the better part of a lifetime out there on the lakes. I once asked another captain on the eve of his retirement what he was most looking forward to. "Getting a full night's sleep," he replied without hesitation.

At 11:07 the car ferry *Badger* appeared out of the haze several miles away, laying down a heavy trail of coal smoke. It was a singular moment—two of the last coal-fired steamboats on the lakes, passing each other. That reminded me of an evening long ago on the Mediterranean. Half a day's steam out of Gibraltar, I was standing by the rail when I noticed a line of coal smoke materializing in the distance ahead. I stayed on deck for some time, until finally it was possible to make out an old tramp steamer heading south across our bow in the direction of the Barbary Coast. From its single tall stack came forth that smoke, which now hung like a black contrail across the orange sky as far as I could see. How insignificant the old freighter seemed in comparison with what it had left behind. It was improbable that something so small could leave such a mark—much like Man himself, I thought.

When I was a boy the connotations of coal smoke were much different than they are today. People saw it as a gauge of prosperity, an indication that all of our forces had been mustered and were working full speed ahead with singular purpose. Furnaces roaring and smoke belching from every stack were looked upon with pride as signs of full employment and good times. The very smell of coal smoke was elixir.

Coal was used as fuel on the Great Lakes longer than anywhere else on this side of the world. It was cheap and plentiful, being one of the main cargoes carried by the lake freighters. But coal smoke is in ill repute these days. Not only are coal-burners environmentally unacceptable, they are uneconomical as well because they require extra crew members, special equipment and extra maintenance.

Pollution is one kind of hazard. Fog is another, much more immediate kind. At one point the *Crapo* ran into a fogbank so dense that its afterhouse and stack disappeared from view. Nothing but pea soup ahead—zero visibility as the captain stood glued to the radar, and the boat's whistle sounded every minute. After two hours the stack and afterhouse reappeared, like a ghost ship taking shape astern of us. But as the fog began to dissipate, a bank of thunderheads appeared in the northwest. "It's a classic line squall," said Captain Fisher.

Bob reminded everyone of the time when lightning struck the spar just aft of the pilothouse at exactly the moment the mate stepped out of the door on the way to the head. "Scared him so much he didn't go to the bathroom for three months."

"Thought it was a year," the captain said without lifting his eyes from the radar screen.

The sky darkened all around us, the thunder began to crash and the rain pelted the windows in sheets. The pilothouse shuddered as the wind gusted up to 45 knots. The lake began to seethe. The whitecaps built in intensity. Then, without warning, everything beyond the windows was obliterated. I waited for the *Crapo* to begin to roll, but the wind was in her teeth and she seemed to hardly notice the squall at all. Then, as quickly as it came, it was gone.

After dinner I took up my vigil in the pilothouse once more. Night fell quietly over the lake, and a little after 10 a full moon rose over the Michigan coastline. I stayed up until we passed safely through Grey's Reef and the Straits of Mackinac into Lake Huron a few hours later. Finally, at 2:30, I was overcome by sleep and returned to my cabin. At 6 I was awakened by the sound of the *Crapo*'s deep whistle as she rounded North Point and headed into Thunder Bay and Alpena. There were two boats ahead of us to be loaded. We waited all day for a berth, and then half the night while enough cement was made to fill the *Crapo*'s holds. Meanwhile our orders had been changed. We were bound for Detroit and Cleveland—to Lake Erie instead of back to Lake Michigan.

The engine room of a steamboat is the very antithesis of the pilothouse. It is hot, noisy, frenetic. Everything is in constant motion: pistons, rocker arms and flashing rods, all perfectly orchestrated, all bathed in glistening oil. It is a confusing, labyrinthine world of condensers, cylinders, pipes and boilers. Standing down there on the *Crapo*'s crank deck our last night out, I felt as if I had been transported to a place where the 20th century didn't exist.

The engine was at center stage. The smell of hot grease was stifling. My eye fell on the hypnotic rhythm of the eccentrics and the valve gears rocking to and fro. How could anything so simple at the same time be so complex and precise? Where else, I wondered, is such brute force so finely tuned?

Ever since the *Crapo* left Alpena several hours earlier, that awesome machine had been pounding away without letup. Not until the captain rang "finished with engine" on the

Text continues on page 46

Anchor chain, 540 feet of it, is stored ready for use in the chain locker of the *Kinsman Enterprise*. The chain is made up of double links more than 2 inches thick and 10 inches long. The anchor weighs 10,000 pounds.

Eugene Lay, an oiler on the *Crispin Oglebay*, takes a breather topside.

Walter Brown, a stokerman on the *Irvin L. Clymer*, keeps shovel ready.

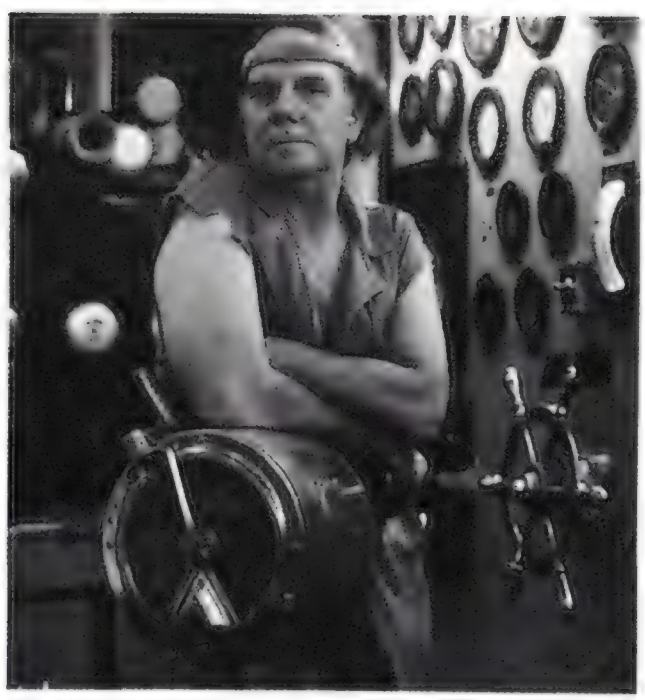
For 23 years Leonard Werda has been the *S. T. Crapo*'s chief engineer.

Huge bolts (above) anchor the foot of a connecting rod to crankshaft-bearing halves on engine of the *E. M. Ford*.

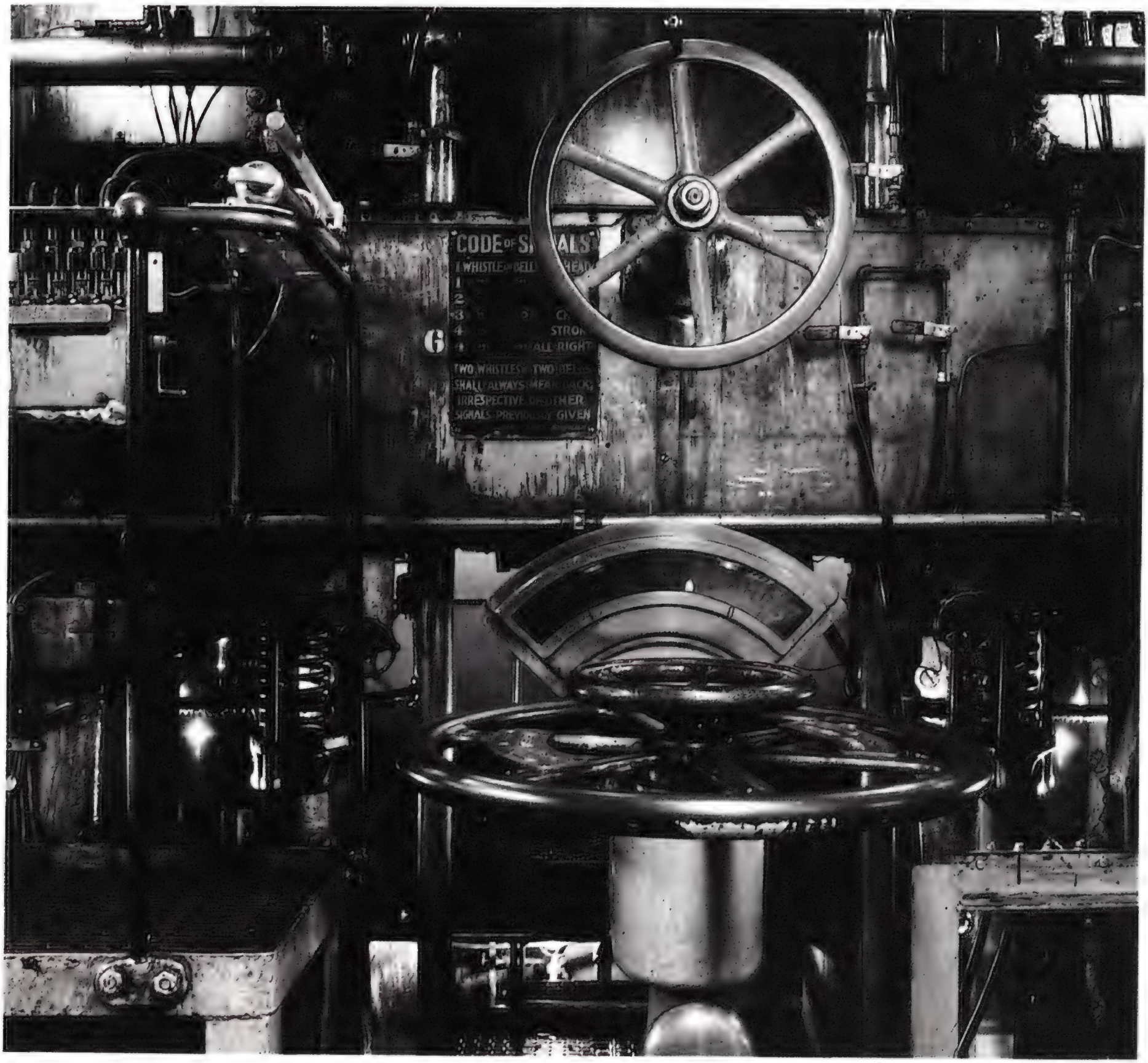
Bottom wheel on engine of *J. Burton Ayers* (opposite) controls forward and reverse. Upper wheel is the throttle.

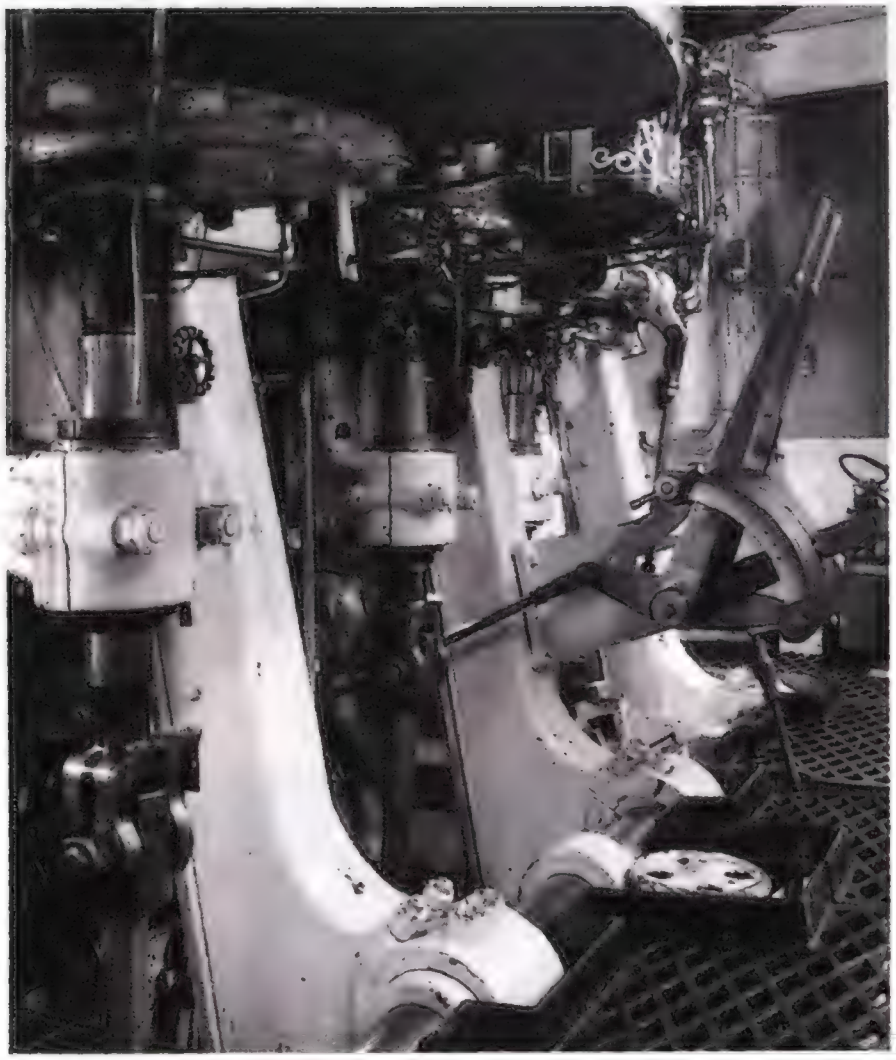
Michael Quaine, another stokerman on the *Clymer*, attends boiler post.

Dick McCarthy, an engineer on the *Crispin Oglebay*, minds the controls.



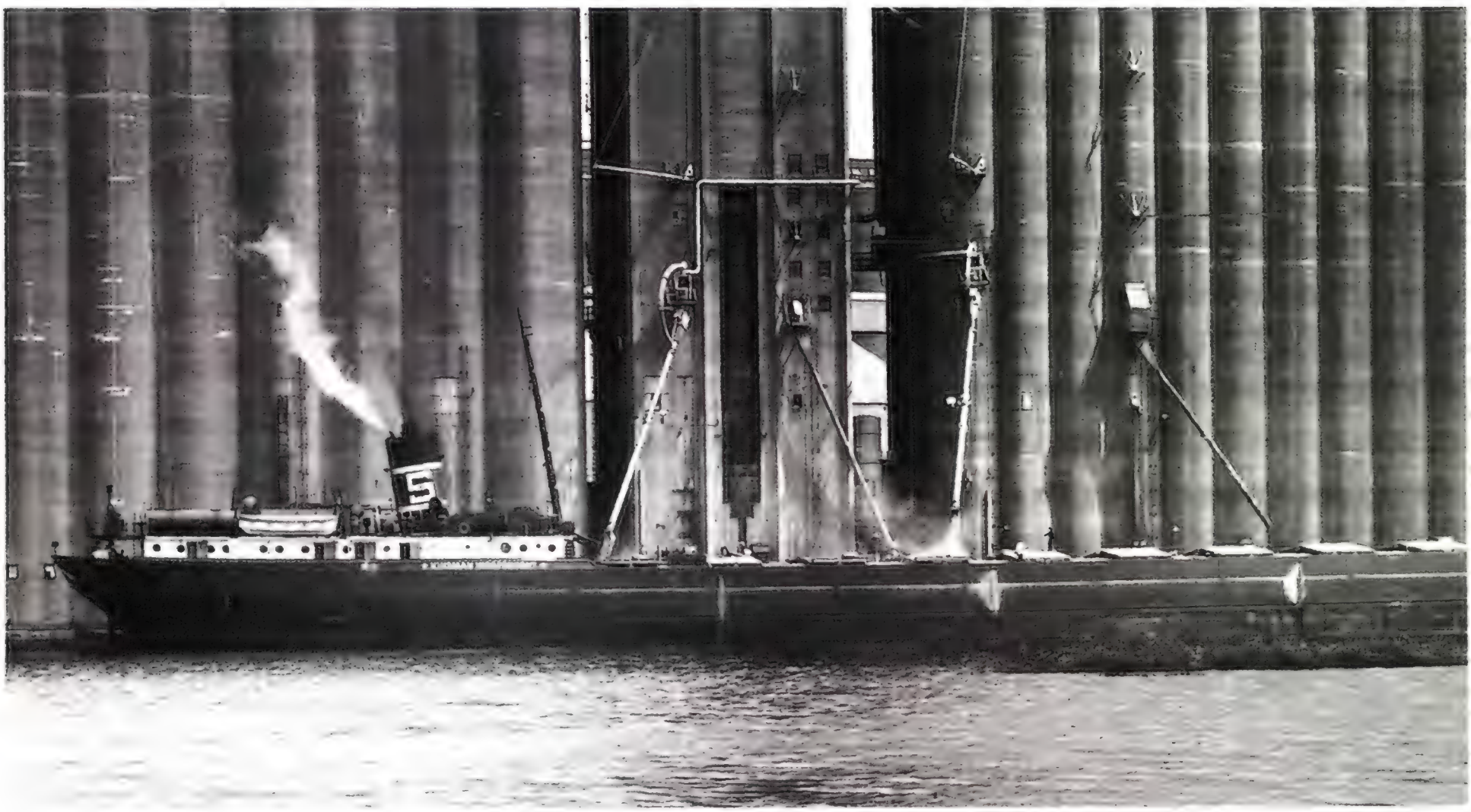
Douglas Monk, one of the *Clymer*'s engineers, rests an elbow on telegraph.





A stalwart quadruple expansion engine has powered the *E. M. Ford* since she was christened in 1898.

On the *Medusa Challenger*'s Skinner Unaflow, a more advanced engine, levers control forward and reverse.



The *Kinsman Independent (2)* takes on a load of wheat in Superior, Wisconsin, a few years before her retirement.

Fireman Rodney Ruell pulls red-hot clinkers out of the *Crapo*'s roaring furnace. Coal-feeders slant overhead.

The *Crispin Oglebay* passes sailboat as she backs out of Milwaukee harbor.

Chadburn in Detroit would its labors finally cease. In a year, perhaps two or three, that command would in all likelihood be rung for the last time, and those hot, noisy, throbbing works would be stilled forever. But on this night up in the pilothouse the Chadburn was pointing to "full ahead" and the great machine seemed to be living a life of its own.

Everything was working in unison. The seemingly crazy motion of the eccentrics was in fact precisely controlling the valves. The valves in turn were admitting and expelling the steam that drove the pistons up and down. The pistons were imparting the steam's energy to the connecting rods and, finally, to the cranks themselves, which were turning the great screw of the stern at a steady 80 revolutions per minute. The engine operated with such mesmerizing repetition that it seemed to be self-sufficient. But of course it was being tended by a crew of men.

One of those crewmen was Nelson Hawley, a short guy in overalls with a flashlight in his back pocket. He was the oiler. Twice each hour, an oiler was supposed to check all of the moving parts in the engine room to make sure none were overheating. First Hawley topped up each of the oil cups situated dangerously close to the churning machinery. Then, with his oilcan, he administered a drop here, a drop there, taking care to wipe down afterward with a rag. That took him five minutes. Then he began the next part of his ritual, the part he called "feeling around."

Hawley stepped onto a platform under the cylinder block. The blur of the pistons and crossheads was just inches away from his head. This time it was not the spout of the oilcan he thrust into the flailing machinery, it was his own hand. From bearing to bearing he went, slapping each one as it raced up and down. Then he proceeded to do the same thing with the giant cranks. He was taking the engine's temperature, like a mother feeling her child's forehead. One wrong move, though, and his hand would have been crushed.

"After you get on to it, it becomes natural," Hawley explained. "I just stay relaxed. Keep the hand stiff and it'll get broken."

If the engine room is the heart of a coal-burning steamer, the firehold is its gut—a belowdecks hellhole where sweaty men keep watch over the furnaces and boilers that make the steam that drives the rods. There I found my old acquaintance Rodney Ruell engaged in a time-honored pursuit, pulling the ashes out of the furnaces. All coal fires produce ash and clinkers—unburnable chunks—and unless they are removed from the grates periodically, they will choke off the fire. To do this the fireman wings the fire to one side of the furnace and pulls the ashes from the other. At midnight, Joe McKay, another old friend, came on watch. Unlike Rodney, who took a long time to arrange all of his tools and then set about his task methodically, Joe attacked the fire with demonic fury.

When he was working on the No. 4 furnace, a fiery clinker that must have weighed 15 pounds fell on the deck plates, and Joe went at it with slice bar and water hose as if he were a knight engaged in mortal combat with a dragon. Then, having subdued it, he grinned proudly. "I keep them sometimes," he said. "I make sculptures from them. Animals, usually." He offered to make one for me, and a month later, when I showed up in the firehold again, he had made not one but two little sculptures for me—a dog and a frog that he had chipped out of clinkers. "Good for paperweights," he said.

As the size of bulk carriers has increased over the years, the number of boats in service on the Great Lakes has dwindled. In 1944 there were about 350 carriers in the American fleet alone; last year there were 62. The oldest vessels are all but extinct.

The *J. B. Ford*, the laker I was waiting for that morning in Waukegan, steams no more. She was taken out of service a few months after I watched her materialize on the horizon. Today she's being used to store cement amid the industrial complexes along the Calumet River in Chicago. Her boilers are cold, her engine is stilled, her once glistening rods and cranks are coated with grimy layers of congealed oil. At this writing just three lakers powered by expansion reciprocating engines are still working on the lakes: the *S. T. Crapo* and her consort, the *E. M. Ford*, and the *Willowglen*, sold to Canadians in 1981. The *Crapo* is the only working coal-burning freighter. The *E. M. Ford*, which was built in 1898 and is the oldest extant commercial steamboat, was laid up this summer. From now on she will be used as a spare boat in "spot" service.

Two other notable old lakers still in service are the *Medusa Challenger* and the *Kinsman Enterprise*. The *Challenger* was built in 1906 and was subsequently repowered with a variation of the reciprocating engine known as the Skinner Unaflow. Like the *E. M. Ford*, her appearance has

been drastically changed over the years. The *Enterprise*, built the same year as the *Crapo*, has been repowered with a steam turbine, but she still has the classic steamer look, despite her truncated stack. Another turbine vessel with classic laker hallmarks is the *Alpena*, built in 1942.

Most of the lakers I knew in their last years have already been reduced to razor blades. The *Kinsman Independent (2)* is gone. The *Henry Steinbrenner*, formerly the *William A. McGonagle*, the last of the 600-footers and, like the *Crapo*, a coal-burner, is laid up. Both the *Crispin Oglebay* and the *J. Burton Ayers* are currently out of service. These two and the *Willowglen* are among the six survivors of the notable class of vessel designed by the U.S. Maritime Commission during World War II to carry the increased wartime tonnage on the lakes—the lakes' equivalent of the renowned Liberty Ships.

While it's safe to assume that vessels powered by steam turbines will be plying the lakes for some time, the era of the reciprocating engine and the coal-burning steamer is at an end. One of these days the last classic laker will steam over the horizon, never to return. A couple of years ago I asked the captain of the *Irvin L. Clymer*, a venerable coal-burner whose reciprocating engine was converted to turbine nearly 40 years ago, if there is a special ceremony when a steamboat is brought into port for the last time. "No," he replied, "we just lock her up and go home." Currently the old "Queen of the Lakes," as the *Clymer* is called by some sailors, is locked up at a dock in Superior, awaiting an upturn in the scrap metal market.

Inky pall of coal smoke spews from the *Crapo* as she makes her deliberate way past the beach at Waukegan, Illinois.

VELMA WILLARSON wanted something that could fly down the highway with a fifty-pound load of birdseed.

Ask any rosebreasted grosbeak or nuthatch around Winchester, Wisconsin, and they'll tell you about Velma. She feeds them and hundreds of other wild birds out of the goodness of her 76-year-old heart. They'll tell you how they used to watch her struggling to lift big bags of birdseed out of the back of her old sport coupe.

But no more.

Now Velma's got a brand new Saturn. It not only has a

©1991 Saturn Corporation. Velma Willarson is pictured with a 1992 Saturn SC.

roomy, convenient trunk, but back seats that fold down. Meaning, to everyone's benefit, an increased birdseed-per-trip efficiency.

They'll also tell you that Velma's new Saturn is just about as aerodynamic as anything that rolls on the ground can get.

In fact, the only thing they don't seem to like that much is how quiet the Saturn is. When Velma had her old car, they could hear the sound of lunch coming for miles.

But now, she has to honk.

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By Bruce Watson

Tom Swift, Nancy Drew and pals all had the same dad

Looking more the proper banker than creator of adventure tales, Stratemeyer turned fantasies to gold.

His name was Edward Stratemeyer, and he can claim the Bobbsey Twins, the Hardy Boys and Bunny Brown and his Sister Sue, as well

On the loveliest of spring mornings in 1910, a middle-aged juvenile awoke in his peaceful New Jersey home and his dreams began. Showering, he outlined the lively scenario for another title in the "Dorothy Dale, A Girl of Today" series. Dressing in tight starched collar, suspenders and tweeds, he sent Jack Ranger and his chums in search of danger. Shaving, he chuckled over the haps and mishaps of two adorable pairs of twins at the seashore. And if he seemed distracted at breakfast, blame it on the lion he was stalking with his electric rifle.

"Tom's killed him with his electric rifle!" cried Mr. Damon. "Bless my dynamo! But that's a wonderful gun; it's as powerful as a thunderbolt, or as gentle as a summer shower."

On the train to Manhattan, his wire-rimmed glasses and Victorian demeanor might have labeled him a deacon or a schoolmaster. But in his own mind he was Baseball Joe pitching on a boarding-school nine. Walking up 25th Street, the author became a young sleuth bound for action and plenty of it! A block from his office, a speeding car went out of control and bolted straight for him! In a flash, the wide-awake detective leapt out of harm's way! That was close! But look! A runaway truck was bearing down on a woman and her two helpless children! Without missing a beat, the brave hero jumped into the cab! He slammed on the brakes and guided the hulking vehicle to a halt!

"What luck!" he remarked to himself.

By the time he reached his office, his imagination was in fifth gear. He summoned his secretary and for the rest of the day, if anyone called, he was out on adventures. Who was the mysterious author? He was: Arthur M. Winfield, Captain Ralph Bonehill, Alice B. Emerson, Roy Rockwood, Margaret Penrose, Captain Quincy Allen, Laura Lee Hope, Jack Lancer and a host of others. But at 5 o'clock when he caught the train back home, he was himself again, Edward Stratemeyer.

Even to his readers, Edward Stratemeyer needs a lengthy introduction. Ask a librarian to name the most influential American author and the usual writers will be trotted out. But ask who, disguised as numerous mild-mannered scribes, dominated his genre as no other author before or since, and there are some bets to be won around the juvenile section of your local library.

Edward Stratemeyer was not a mere author; he was a literary machine. Like the upwardly mobile characters of his early stories, he was an innocent in the promised land, a dime-novel writer who struck it rich. Between 1900 and 1930, he turned his uncanny sense of young readers' tastes into an action and adventure factory that churned out more than 1,300 juvenile novels in 125 different series written under scores of distinct and slightly stilted pseudonyms.

"Dana Girls" series, touting exploits of sister sleuths Louise and Jean, ran to 34 volumes, ending in 1979.

Edward Stratemeyer's wide-awake crew

"IT'S GONE!" EXCLAIMED TOM. "GONE!"

In *Tom Swift and his Television Detector*, from 1933, hero uses trademark techno-wizardry to foil crime.

From this one imagination came the fearless deep-sea diver Dave Fearless, the dashing aviator Dave Dashaway, and "manly, up-to-date" young men like the Rover Boys, the Darewell Chums and Don Sturdy. For girls, Stratemeyer created the first action heroines, including Ruth Fielding, the Outdoor Girls, and the Moving Picture Girls. And for younger children, he created syrupy gumdrops like Honey Bunch, and Bunny Brown and his Sister Sue, cute enough to raise your blood sugar in a single page.

Most of Stratemeyer's characters have passed with their times, but some have endured and adapted to become clichés in children's literature. Librarians may be surprised to know that there was no Victor Appleton, creator of Tom Swift. There was no Franklin W. Dixon, author of the Hardy Boys, no Laura Lee Hope of the Bobbsey Twins, not even a Carolyn Keene, creator of Nancy Drew. All these legendary creators and legendary characters were conceived by the adroit mind of Edward Stratemeyer.

A secretive author's Rx for happiness

A stream of series fiction, born out of his Stratemeyer Syndicate and mass-marketed at 50 cents a copy, boosted Stratemeyer's lifetime sales to more than 200 million copies, enough to circle the globe with action, adventure and exclamation points. But while he is counting his money, let us leave our hero and his inventions for a moment to recap his earlier deeds.

And so, while he is watching that awful plunge with the fear of impending death in his heart, it may be well for the benefit of those who have not read the preceding volumes of this series to tell who Ted Scott was and what his adventures had been up to the time this story opens.

There are as many mysteries in Stratemeyer's life as in his stories. Since no definitive biography of the straitlaced author has ever been written, deciphering his life is a task worthy of Frank and Joe Hardy, with a little help from Nancy Drew herself.

Joe murmured, "Funny he's so secretive about where he lives and works."

Chet scoffed. "There you go again, making a mystery out of it."

Down the secret path of childhood, our first clue comes in a boy's reading. "As a boy . . . I had quite a library, including many of Optic's and Alger's books," Stratemeyer observed in a rare interview. "At seven or eight when I was reading them I said: 'If I could only write books like that I'd be the happiest person on earth.'"

In post-Civil War America the juvenile market was dominated by the dime novels, whose creators included Oliver Optic and Horatio Alger jr. While wide-eyed

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Le Grand Café

dreamers turned the pages of *Ragged Dick, Tattered Tom, Do and Dare* and *Poor and Proud*, ordinary boys rose from poverty to giddy success. Optic, Alger and other dime novelists churned out 100,000 words a month for magazines and book publishers, barely enough to satisfy the rags-to-riches fantasies of youths mired in the mean cities or stuck behind a plow. Growing up in the 1870s in Elizabeth, New Jersey, young Edward Stratemeyer, son of a German immigrant who had ventured to California during the gold rush, read as many dime novels as he had dimes.

In both Alger and Optic, a meteoric rise depended on sheer resourcefulness, virtue and one pivotal moment when the hero took a chance, dared to be great—and the rest was myth. For Stratemeyer, the crossroads came in 1889.

He had got no further than the eighth grade. By the time he set out to make his fortune, enviable young boys were bound for prep schools. The 27-year-old Stratemeyer, working in his brother's tobacco store, could only imagine such adventure. One slow afternoon in this fateful year, he tore some brown wrapping paper from a roll behind the store counter and began to write a story. Stratemeyer sent "Victor Horton's Idea," on its original wrapping paper, to *Golden Days*, a boys' magazine in Philadelphia. A few weeks later he received a check for $75, six times his weekly wage.

Brains, luck, a dollop of pluck

By 1892, Stratemeyer was selling dozens of his sudden-success stories. Soon he was hired as an editor at Street & Smith, the prolific juvenile publisher. There he worked with Upton Sinclair, then known for the "True Blue" series and later famous for *The Jungle* and other muckraking novels. Stratemeyer published 16 dime novels in three years. But he might have remained just another Walter Mitty with a pen had not luck intervened.

"Isn't she lucky? Wish I were in her shoes."

"Lucky? It's brains and pluck."

Brains, luck, a dollop of pluck, perhaps it was all three. In 1898, a few days after Commodore Dewey steamed into Manila Bay, Stratemeyer had completed his adventure about two boys on a battleship. The Spanish-American War was front-page news, and the publisher asked Stratemeyer to change a few elements, such as the plot and setting, in his novel. Within a month, *Under Dewey at Manila; or, The War Fortunes of a Castaway* was on the newsstands. The thrill-a-minute book went through four printings, and publishers clamored for more.

Happy to oblige, Stratemeyer sent his boy heroes charging up San Juan Hill and fighting in the jungles of Luzon. Soon his "Old Glory" series was selling like hotcakes. But like his own protagonists, Stratemeyer could not have dreamed of the adventures that lay ahead. In the late 19th century, dime-novel writers measured their success in thousands of copies. Stratemeyer would measure his in millions. His good fortune had as much to do with the market itself as with his own tactics, as our second clue to his achievements, found in an old history book, suggests.

When Stratemeyer himself was a mere boy, children did not have time to be "teenagers." The harsh economics of an industrializing America turned most children into instant adults, working, competing, having children themselves. But by 1900, social consciousness and prosperity were beginning to prolong childhood, creating a new stage of life—adolescence.

THEY HEARD A TERRIBLE BLOOD-CHILLING YELL OF FEAR . . .

While the Clock Ticked, 1932, pits Joe and Frank Hardy against foes for whom "jail was much too good."

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From 1900 to 1930, Stratemeyer's golden years, adolescence came of age. Restrictive child labor laws ordained compulsory schooling until age 16. Even after mastering his lessons, the 13-year-old student had far more free time than his working counterpart of the previous century. With no TV or radio, no George Lucas, no Elvis, no Hard Rock Cafes, young Americans looked elsewhere for adventure. They looked to fantasy and fiction.

In 1899, when nearly half the population was under 20, Stratemeyer created the "Rover Boys Series for Young Americans." "To those who have read any of the previous volumes in this 'Rover Boys Series,'" he wrote, "the three brothers will need no special introduction. For the benefit of new readers allow me to state that Dick was the oldest, fun-loving Tom next, and Sam the youngest. They were the sons of Anderson Rover, a widower and rich mine owner . . ."

Unwittingly, or possibly by sheer resourcefulness, Stratemeyer had stumbled upon a formula that would define juvenile fiction for the next 50 years. In the first decade of the new century, airplanes, cars, radios and movies entered the public imagination. Peary reached the North Pole, miners flocked to the Alaskan frontier, and American inventors, statesmen and athletes dominated the headlines. Suddenly, "rags-to-riches" was no longer the only dream. Adolescents trapped in a classroom, tenement or city yearned to journey to distant lands, go to college, toy with technology, play in the major leagues. And being adolescents, they wanted to do all this as if there were no such thing as parents.

Fiction full of slam-bang action

As his gift to juveniles, Stratemeyer created the superteen, "wide-awake" boys and girls who could drive cars, fly airplanes, perform Houdini escapes, even quote Shakespeare. Orphaned or under the care of a single parent who was always out of town, Stratemeyer's superteens enjoyed unlimited freedom. In book after book, their mile-a-minute adventures sent them to camp, to the prairie, to college, to Mexico, the Pacific, the Rockies. Unlike the literature peddled by teachers, Stratemeyer's serial fiction was full of slam-bang action, cliff-hanging adventure.

Every red-blooded boy will enjoy the thrilling adventures of Don Sturdy. In company with his uncles, one a big game hunter, the other a noted scientist, he travels far and wide—into the jungles of South America, across the Sahara, deep into the African jungle, up where the Alaskan volcanoes spout, down among the head hunters of Borneo and many other places where there is danger and excitement.

The peripatetic Rover Boys quickly became the nation's best-selling children's heroes. Several spin-offs followed. Stratemeyer's heroes were "lively, flesh-and-blood fellows." His heroines were career girls long before "having it all" became popular.

A pantheon of heroes real and imagined peopled Stratemeyer Syndicate pages, winning myriad readers.

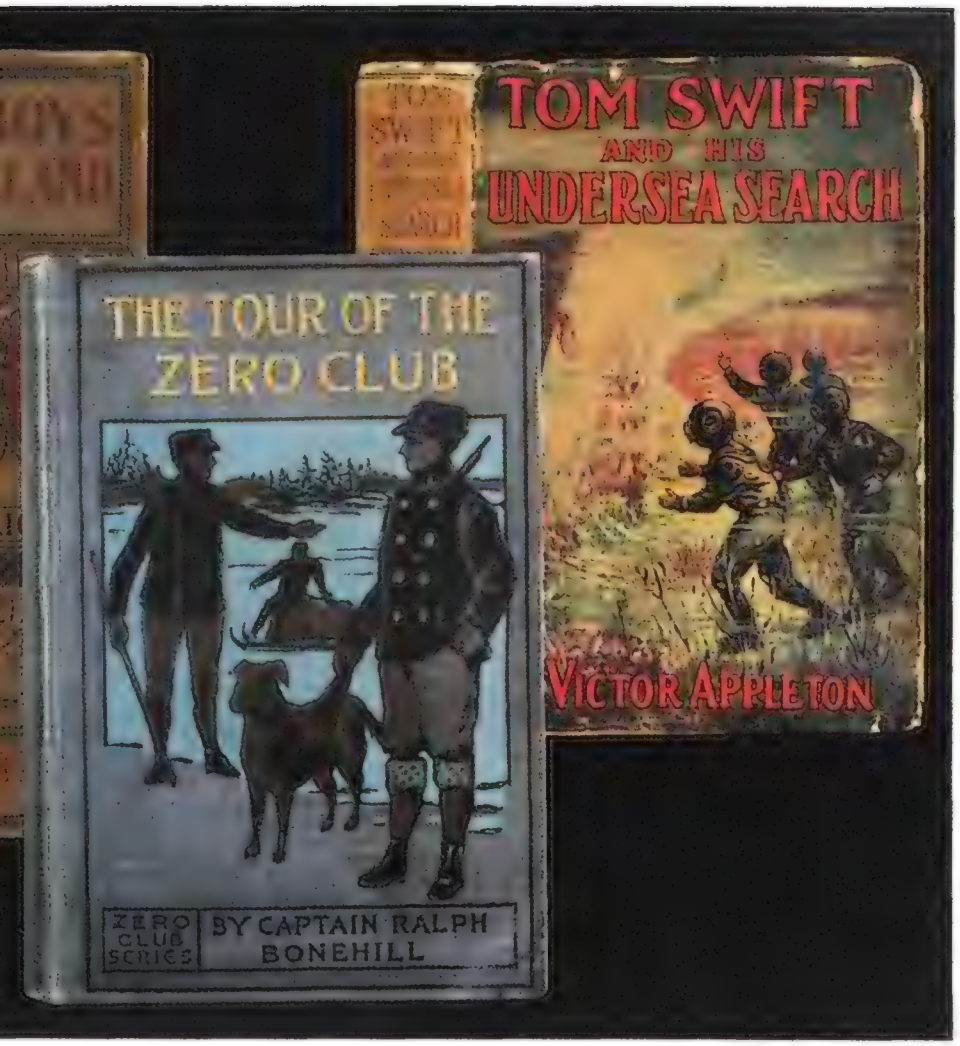
"There she is! That girl in the blue sweater is Ruth Fielding!"

"You mean the one giving orders through the megaphone? She looks too young to be a moving picture director."

By 1910, American youth was ready for outer space. That year Stratemeyer created that hero of juvenile science fiction, Tom Swift. The "bright, ingenious youth" quickly set about inventing an airship, a submarine, a phototelephone, and a giant cannon to protect the Panama Canal. As Tom flew *Red Cloud* around the world, his sales soon surpassed the Rover Boys'.

A third clue to the enigmatic author's accomplishments can be unearthed deep in his psyche. Stratemeyer knew the juvenile mind because when he sat down to write, his was a juvenile mind. Living the adventures that early hard work had denied him, he was Tom Swift stalking the lion. He was Sam Rover frantically mending a burst steam pipe on a riverboat. Sometimes, if a fellow writer was on hand, Stratemeyer would duck behind his desk and stage a mock shoot-out.

Bruce Watson once wrote for SMITHSONIAN *about a television viewer whose unread great books jump off the library shelves and make him go straight.*



Hardy Boys, future President Zachary Taylor, Rover Boys, Zero Club chums and Tom Swift were all-stars.

When the story was finished, edited, polished, Stratemeyer matured instantly and became the consummate businessman. He kept all rights to his books, even after publication. If a publisher balked, Stratemeyer found another, quick as a flash! In 1906, a few years before the Model T, he convinced one publisher to lower the price of his books from $1.25 a copy to 50 cents. Sales soared, and other publishers quickly followed suit.

Throughout his life, Stratemeyer also kept his domestic life serene, so that he could wander in his mind. At home in suburban New Jersey, while living the family life of a father of two, he bowled, rooted for Christy Mathewson and the New York Giants, and drove an automobile. At work he dreamed excitement aplenty, dictating 7,500 words from 9 to 5. But even at such a pace, how could one man produce 1,300 books bearing his name(s)?

Realizing that he had many more characters and plots than he could possibly work into full novels, in 1906 Stratemeyer came up with his most fruitful idea yet. He began fashioning story ideas into detailed three-page outlines. He sent these sketches to aspiring authors whom he had lured through the classifieds. Within a month, each hired pen would flesh an outline into a full novel. Stratemeyer edited the final work, checked it for consistency with previous books and sent it to the publisher.

His writers earned from $50 to $250 per book, signed away all rights to the Stratemeyer Syndicate and agreed never to divulge their true identities. Stratemeyer also made certain, by staggering their appointments, that no two of his authors ever chanced to meet and compare pseudonyms. Thus, the syndicate's products came out under a flow of fictitious names.

Lester Chadwick penned "Baseball Joe." Roy Rockwood dashed off the "Dave Dashaway," "Speedwell Boys" and "Bomba the Jungle Boy" series. Laura Lee Hope authored the "Moving Picture Girls," the "Outdoor Girls" and in her spare time, the "Bobbsey Twins." Each writer was a certified expert. Lester Chadwick, the publisher's blurb noted, "has played on the diamond and on the gridiron himself." Margaret Penrose, author of the "Motor Girls" series, "besides being an able writer, is an expert automobilist."

Rules for churning 'em out by the hundreds

Many of the actual writers were journalists who wrote a few books and then found more gainful employment. But a few rivaled Stratemeyer for productivity. Howard Garis, the real Victor Appleton of Tom Swift fame, also created his own popular Uncle Wiggily stories for children. His wife, Lillian, wrote many of the girls' series. But all of the characters, all of the plots, came from Stratemeyer himself, who also found time to dictate a book or two of his own every week.

In order to be present at the creation of more than 1,300 books written by a host of authors, Stratemeyer established rules for his writers. Rule No. 1: a series was to be introduced with three books. If these sold well, more followed. After seven titles, a series was said to be a "breeder." The more-successful series bred into the second generation. By the 1920s, the Rover Boys settled down, married their sweethearts and had roving sons whose adventures filled the last ten books of the series. In the 1950s, when the name Stratemeyer on the syndicate door belonged to the author's elder daughter, Harriet (p. 60), Tom Swift begat Tom Swift jr., written by Victor Appleton II.

Rule No. 2: the previous books in the series were to be reviewed in the first chapter, thus telling readers what derring-do they had missed. Rule No. 3: the upcoming book would be previewed in the final chapter.

"Well, I suppose our good times and our adventures are over now," said Sam. But he was mistaken. Good times and strange adventures still awaited them, and what some of these were will be told in the next volume of this series, to be entitled "The Rover Boys on the Farm; or, Last Days at Putnam Hall."

In between recap and preview, almost anything could happen. Early on, the Rover Boys developed a talent for having their luggage stolen. The Hardy Boys later proved adept at exploring claustrophobic spaces

In *Nancy Drew and the Hardy Boys, Super Sleuths!*, 1984, the famed girl and boy detectives joined forces.

like caves, old forts and deserted cabins. Nancy Drew, though a skilled pilot, driver and motorboat captain, could never seem to find a vehicle without a jammed throttle, a flat tire, bum steering or faulty brakes.

Like other Stratemeyer hometowns, Nancy's River Heights was a quiet, peaceful glen teeming beneath the surface with smugglers, thieves, brazen teenagers and common folk who would hit you over the head and drag you into a closet at the first opportunity. As if that weren't bad enough, Stratemeyer hometowns were besieged daily by thunderstorms and torrential rains. But somehow the plucky protagonists and their chums arrived home safely—home, where their parent or guardian gave full approval to their death-defying adventures. Superteens one and all, they refused any reward, settling for lemonade or cookies.

"We owe you and the others a great deal."

"All of you are regular heroes."

"Heroes? Pooh!" sniffed Tom. "Nothing of the sort. We are just wide-awake American boys."

From conception to publication, a syndicate book was produced in 40 days. By 1912, luck, pluck and keen business acumen helped the Stratemeyer Syndicate keep 22 different series in progress, each accounting for three to five new adventures per year. Each book sold through several printings, and Stratemeyer took home $50,000 a year when $50,000 was real loot. Looking back on Stratemeyer's career, *Fortune* magazine summed up the production succinctly: "As oil had its Rockefeller, literature had its Stratemeyer."

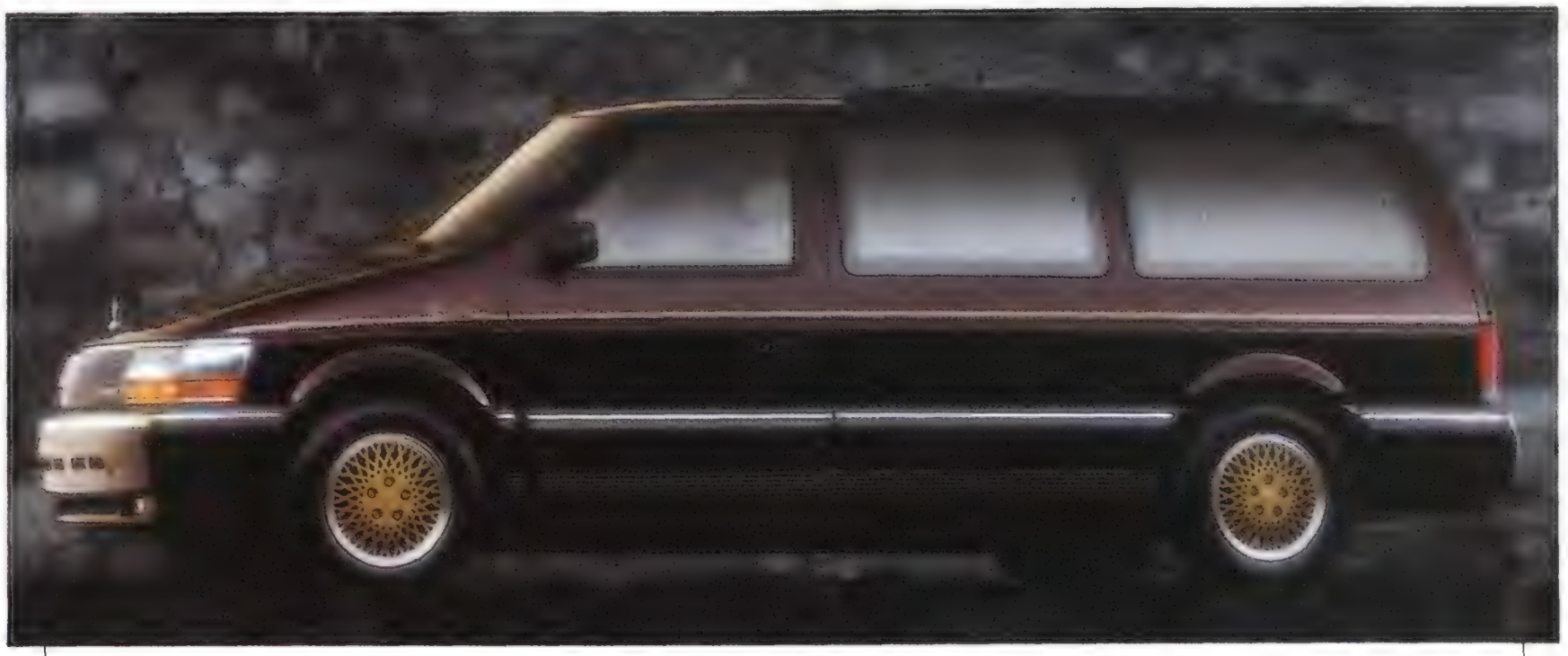
A business magazine might dare to call "Ralph of the Railroad" literature, but others were not so sure. Perhaps it was the stilted style. "Dick! Dick! Are you killed?" Sam Rover asks his wounded brother in one adventure. Maybe it was the Stratemeyer habit of never having his characters "say" anything. For page after page, characters suggest, smile, remark, mutter, reason, muse, murmur or ejaculate their words. Perhaps it was just jealousy. As series fiction by Stratemeyer and his numerous imitators flooded the market, critics with cultivated literary tastes raised eyebrows. Eventually they raised a fuss.

As adolescence matured in the public imagination of the early 1900s, so did its flip side—juvenile delinquency. Every Stratemeyer work had a villain or two, a fallen teen or jealous rival lurking behind nefarious schemes in every part of the globe. Ingenuity and virtue conquered each within 250 pages. But many concerned educators and clergy blamed the emerging adolescent culture—and Stratemeyer. As Stratemeyer's syndicate flourished, some librarians banned series fiction from their shelves.

But while teachers pushed Robert Louis Stevenson, the nation's juveniles hid Dave Fearless behind the covers of *Kidnapped*. Every year more books, more series, came out. Teachers grumbled. Parents got together. And into the thick rode the chief librarian of the Boy Scouts of America.

The perils of "cheap reading"

"The red blooded boy, the boy in his early teens, must have his thrill," wrote Franklin K. Mathiews in 1913. "He craves excitement, has a passion for action . . . and in nothing is this more true than in his reading." All books had thrills, Mathiews wrote, but in subversive works like the "Rover Boys," "no effort is made to confine or control these highly explosive elements. The result is that, as some boys read such books, their imaginations are literally 'blown out,' and they go into life as terribly crippled as though by some material explosion they had lost a hand or foot." Mathiews' widely read article, "Blowing Out The Boy's Brains," closed by citing a letter from a parent of a runaway. "He has a good home, and his parents seem quiet but thrifty. The only possible clue I can find is 'cheap reading.' "



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Harriet Stratemeyer Adams took over the family publishing empire after her father's death in 1930.

Mathiews' call to arms led women in Portland, Oregon, to the bookstores, where they urged boys not to buy bombshells like *Tommy Tiptop and his Baseball Nine*. Some booksellers returned their Tom Swifts. Despite the criticism, Stratemeyer's books continued to sell more than four million copies annually. "Any writer who has the young for an audience," he said, "can snap his fingers at all the other critics." By 1926, when librarians surveyed young readers' tastes, they found to their disgust that Tom Swift was on 98 percent of their students' reading lists.

Stratemeyer had risen from pulp to riches. He was a millionaire and a million-selling author many times over. Yet even by the late 1920s, he remained largely unknown to the public. Given that few knew of him then and even fewer now, why was daughter Harriet praised by feminist critics and given honorary degrees from several universities? A final clue comes from a young girl's bookshelf.

"Girls! It's Nancy Drew!" she exclaimed joyfully and made introductions.

As with all series, Stratemeyer himself wrote the first three Nancy Drew mysteries. They were cut in the familiar mold but without the sophomoric humor that often slowed the earlier action tales. These were detective stories whose active "young sleuth" kept the reader turning pages and reading book after book after book after book after . . .

In her 1930 debut, Nancy Drew drives a convertible, pilots a speedboat, fixes a sprained ankle, repairs a motor, quotes Archimedes and finds a missing will in an old clock. Such expertise quickly made the adventure series of this superteen the best-selling Stratemeyer work of all time, topping the Rover Boys, topping Tom Swift. The equally clever Hardy Boys, created in 1927 just after the Rovers retired, took second place. The two series continue to sell. Through more than 60 mysteries translated into 14 languages, Nancy's sales now top 80 million copies; the Hardys have sold 50 million. In 1978 they even teamed up to meet Dracula in a TV series. Both Franklin W. Dixon and Carolyn Keene would be proud—if they existed.

When Stratemeyer died suddenly in May 1930, "the publishers were aghast that the empire might crumble," Harriet Stratemeyer Adams explained in an interview. "They begged my sister and me to continue." Harriet had frequently asked her father for a chance to write, but he had refused. Nancy Drew might have a career, but real women belonged at home, he said. Complying with his dictate about home, Adams moved the syndicate office to her hometown of East Orange, New Jersey. There she began running the syndicate much as her father had.

Throughout the 1930s and '40s, the number of series gradually declined. But Adams hired writers to keep the Hardy Boys, Tom Swift and the Bobbsey Twins alive. In the 1950s she supervised rewrites of earlier works, updating the technology and eliminating the ethnic stereotypes and dialect. (They continue to be updated, sometimes for the worse, as writer Cullen Murphy recently observed in the *Atlantic*.) She created the successful Dana Girls and Kay Tracey stories. Above all, until her death in 1982 at age 89, Harriet Stratemeyer Adams was the real Carolyn Keene.

A hundred years after Edward Stratemeyer turned brown wrapping paper into gold, his syndicate sells more than two million books per year. In a world of Heavy Metal and Ninja Turtles, adolescence seems embattled, a reckless stage of life that strikes at an earlier age these days, lasts longer, baffles doctors and parents alike. But it is still cured only by independence and dreams of omnipotence. No one ever understood this better than Edward Stratemeyer, the prim, Victorian man-child in his world of thrills, danger and a million exclamation points.

"Six Little Bunkers" series, appearing from 1918 to 1933, chronicled adventures of large and happy family.

SIX LITTLE BUNKERS *at* HAPPY JIM'S

LAURA LEE HOPE

It's time for a change to Gallo.

Grilled scallops with julienne zucchini and carrots.

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By Richard Wolkomir

Falling into the Gadget Gap—and it's not our fault

If you own a lot of fancy gizmos that you can't work, don't blame yourself. Cognitive scientists say lousy design is the problem

I've finally tried using our car's radio, which is embarrassing, since we bought the car more than two years ago. But this radio is one of those modern techno-things, like digital watches and microwave ovens, that seem to be designed with a secret agenda, which is to mortify us and break our spirits.

It has 12 knobs, switches, buttons and push bars, and some of the knobs double as buttons, while some of the buttons double as knobs. Explaining how all that works takes up five pages of the owner's manual, with diagrams. I didn't even consider tackling the radio when we bought the car because there were more important controls to master, like "Shift Lock Override" and the alluring "ECT—Power or Normal." Actually, I never got around to those either, until recently, when I had a nutty urge to press "ECT—Power," just to see what would happen. As far as I could tell, *nothing* happened.

What makes the radio such a tough techno-nut to crack is that you have to watch the road while you fiddle with it, which I did the other day. Twisting the radio's "Power" knob didn't turn it on, but then when I accidentally bumped the knob with my knuckle the readout lit up green and the speakers let out a hi-fi howl. I pushed a button labeled "Fade," but the howl didn't fade. The button just slid in and stayed.

At a stoplight, I pulled out the owner's manual, which said pushing the buttons put them in a "hidden" position. By then, the light had changed and horns were honking behind me. So I turned off the radio. I'll probably take another shot at it in about two more years, if everything else goes OK.

I should work on our telephone first. It's supposed to automatically dial our 12 most-often-called numbers at the push of a button, but in fact it can't automatically dial diddly. That's because it would take all Saturday morning if I ever attempted to program it, which requires pressing buttons in arcane sequences while heeding the manual's warning, "You must complete the storage of each telephone number within 10 seconds to insure proper storage."

In the Pre-Silicon Period, you just picked up a telephone and dialed. Or you turned the radio on, twisted the tuning knob and there was Elvis or Ella. You didn't need an engineering degree from MIT. But a study by Laurence Feldman, a marketing expert at the University of Illinois at Chicago, reveals that today half of us find our high-tech possessions too complex to operate. Why are these things so befuddling?

The answer that springs to mind is: "Maybe you're not so bright, bub!" But I've been talking to experts on what might be called the Gadget Gap. And they say *it's not our fault.*

"It's a conspiracy of silence," says Don Norman, a leader in the burgeoning movement to make things easier to use and the author of *The Design of Everyday Things.* He argues that we're victims of our own shame: "When things don't work right, we all think it's our own fault, and nobody admits having trouble, so nothing changes."

Even engineers are getting flummoxed

Norman does have an engineering degree from MIT, and a PhD in something called mathematical psychology, but things fuddle him, too. A gray-whiskered gremlin with an astute eye, he chairs the department of cognitive science at the University of California, San Diego. Cognitive science is the study of the thinking process. Yet even Norman admits getting flummoxed by VCRs, hotel showers, kitchen stoves, light switches and doors. And he notes that the engineer who founded Digital Equipment Corporation once confessed he couldn't figure out how to heat coffee in a microwave oven.

Norman just sort of sidled into the Gadget Gap issue. He was studying mistakes, including his own flubs, because "human error" gets blamed for at least 75 percent of all industrial accidents. "I had people walking around with notebooks, writing down their mistakes," he says. He consulted with the nuclear power and aviation industries. "But the more I studied human error, like the accident at Three Mile Island, the more it didn't seem to be people's fault, but the design of the equipment they were using." For in-

Illustrations by John Huehnergarth

"You must complete the storage of each telephone number within 10 seconds to insure proper storage."

stance, he found that nuclear power plant operators are required to consult thick manuals, but often no place is provided to put these tomes except on top of the control panel, where the books can inadvertently move switches.

Then Norman spent a sabbatical in Britain. "I got disgusted with English water taps and things," he says. "And I realized that the stuff I'd been learning about the design of nuclear power plants and airliner cockpits also applies to faucets and doors."

I told him about a tussle I'd just had with a door at a hotel. It was glass, except for a hand bar running horizontally across it. I couldn't figure out whether to push or pull, on the left side or on the right. I tried various combinations, banging my luggage like some sort of lower primate. Finally I got it open.

"Visibility problem!" Norman said.

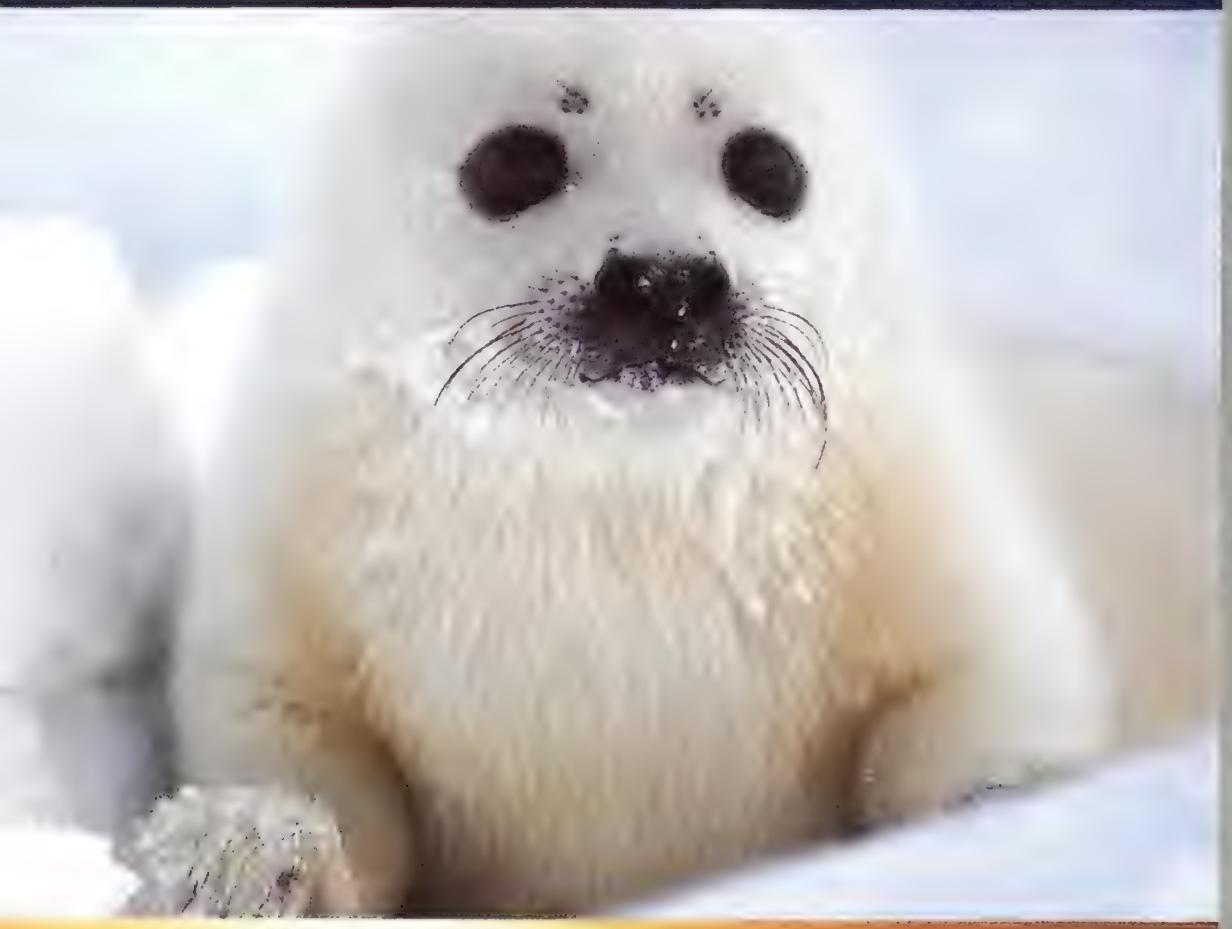
If the door's hinges had been visible, he pointed out, I would have known that the opposite edge swung open. Meanwhile, the horizontal hand bar gave no information. It could have been for pushing or pulling. If the designer had placed a hand-size metal plate near the edge of the door that opened, it would have been clear that you push there.

Norman himself once gave a lecture using a slide projector that had a severe visibility problem. When a student assistant pressed the button to advance the slide tray, it shot out backward and dropped the slides on the floor. Neither Norman nor his helper could figure the thing out. Finally, they called a technician. He said a short push on the button advanced the tray, a long push reversed it. But who would guess?

A vehicular version of I've Got A Secret

Norman advocates "natural design," which means using principles like visibility to create products that we understand intuitively, without having to think about how they work. An example of the opposite was a car I recently rented at an airport: when I parked it, I couldn't get the key out. There was no manual in the car, and it was a week before a smart hotel bellhop figured out that extracting the key required moving the automatic shift lever one notch *beyond* "Park." But that position was unmarked, a vehicular version of *I've Got A Secret.*

Another principle that designers often ignore is "natural mapping," which means arranging controls so it's clear what they do. Norman cites kitchen stoves: the four burners are arranged in a square, but the four controls for the burners—and the oven controls—are usually in a straight line. To be sure you turn on the right burner, you have to peer down at little symbols or code letters next to the controls, "LR, LF, RR, RF." Sometimes you just wing it. That's why I



A FEW COMPELLING REASONS FOR DOUBLE-HULLED OIL TANKERS.

Last year, Du Pont announced that its energy unit, Conoco, would pioneer the use of new double-hulled oil tankers to help safeguard the environment.

Estimates indicate that they'll cost 50 million dollars each–about 15% more than conventional oil tankers. And, they'll carry about 10% less oil.

But estimates also indicate they could eliminate or significantly reduce the damage from oil spills, saving thousands of sea birds, otters, sea lions, dolphins and other sea life.

The reaction has been overwhelmingly positive.

DU PONT

BETTER THINGS FOR BETTER LIVING.

"I couldn't figure out whether to push or pull, on the left side or on the right. I tried various combinations, banging my luggage like some sort of lower primate. Finally I managed to get it open."

often wander into the kitchen a half-hour after I've turned on the electric burner under the kettle and find it stone cold, while the next burner over is glowing cherry red. "If they'd just arrange the controls in a square, to match the layout of the burners, you'd know the right control just by looking," Norman says.

As an example of doing it right, he points to the electric seat-adjustment control on a Mercedes-Benz: it is shaped like a seat. When you push or pull part of the control, such as the backrest, the corresponding part of the actual seat sinks or rises. As an example of doing it almost right, Norman cites a light-switch panel he designed for the living room of his own house. He arranged the switches to match the arrangement of the room's lights. His teenage son, Eric, gleefully showed me where his father had erred.

Besides controlling the room's lights, Eric explained, the switches on the wall-mounted panel also operate a movie screen concealed in the ceiling. "Watch this," he said, standing in front of the panel and pressing a toggle. The movie screen smoothly unrolled from the ceiling and hit him on the head. "See?" Eric said. "Bad design."

Norman's control panel may flunk the common-sense test, but it's a good example of natural mapping, since the arrangement of the controls matches the arrangement of the things controlled. It is what Norman calls "information in the world." A variant, "cultural mapping," is an example of "information in our heads."

"Why do clocks go clockwise?" Norman asks. "It's because most sundials go that way, and so we have the convention that turning something clockwise—like a volume control—means 'more.'" It is a similar cultural convention that moving an electrical switch "up" turns something on. In Britain, it's the reverse. Such cultural norms are often artificial, but designers who ignore them muddle us.

Norman cites one more natural design principle: feedback. For example, when I make a call at home with our upstairs telephone, I hear a tone each time I push a button, which assures me I've done a good job of button pushing. With our downstairs phone, admittedly one of those cheapies you get free "with your paid subscription," when I push the buttons I hear only a continual tapping sound, as if woodpeckers were on the line. With no feedback, I'm not sure I'm getting through to that wee operator I imagine sitting inside.

Designers who ignore principles like feedback, visibility and mapping frazzle our synapses. As one woman told University of Illinois marketing professor Laurence Feldman: "I don't use the automatic shutoff on my new stereo's turntable because I'm afraid it'll malfunction and burn out the motor." A student told Feldman about a new programmable thermostat: "It

After writing this article and one on an MIT robot project in June, Richard Wolkomir claims that he is still a techno-boob who prefers on-off switches.

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"With no feedback, I'm not sure I'm getting through to that wee operator I often imagine sitting inside."

turns out nobody in our family can program it." In fact, says Feldman, more than half the owners of high-tech products never use all the features. Meanwhile, the features keep coming.

RCA's new TV remote control has 38 buttons. Yamaha's "Digital Sound Field Processor," for stereos, allows you—at the push of various combinations of 12 buttons—to make the music sound the way it would in your choice of 23 different places, such as Freiburg Cathedral, the Village Gate or even Anaheim Stadium, complete with echoes from the PA system. You can buy an electronic Bible (the words appear on a screen), an electronic English-French-Spanish phrase translator, and a talking VCR. Ominously, the National Association of Home Builders is currently developing the "Smart House," in which a computer controls everything from the lights and central vacuum cleaner to the coffee maker. You can issue orders to your Smart House from your car telephone. With luck, you'll tell the microwave oven to start cooking your dinner, rather than accidentally telling the fire-protection system to start sprinkling.

But we don't have to wait for the Smart House for us to feel overwhelmed. Don Norman estimates we already cope with about 20,000 "everyday things"—zippers, fan switches, popcorn poppers, digital alarm clocks, staplers and gas pumps. We also have office telephone systems that transfer calls, record messages, forward calls to other telephones and automatically redial busy numbers—as long as you push the right buttons. Otherwise, instead of transferring callers to other lines, you send them to Muzak limbo. Everyone's stress goes up, multiplied by the percentage of our 20,000 everyday things having design glitches. And there are glitches galore.

"All these controls—what does what?" Norman asks, disgusted, as we sit in his living room, where he is exhibiting what must be the world's largest private collection of TV and VCR remote controls. He is firing them at a large-screen TV, making a video a Japanese computer company sent him race forward, freeze, reverse and slow to a crawl. Meanwhile, he is analyzing each remote's pluses and minuses. "Here's one with some of the controls hidden under a flap, to make it less confusing," he says. "That's intelligent— but only if the hidden controls are the ones you don't use often." He flips up the flap, scans the revealed buttons and snorts. "Note that here among the hidden controls is one for selecting channels!" he says.

I found myself thinking of Mr. Kurtz's dying words in *Heart of Darkness*: "The horror! the horror!" In particular, I remembered that to adjust my own TV's controls, I need to use a flashlight because the knobs are hidden in a dim recess under the screen. To operate my VCR, I must literally prostrate myself before it on the floor because the TV table is designed to put it down there. Meanwhile, on the control panel, I can't tell which buttons the labels refer to, because there are so many buttons.

"To be sure you turn on the right burner, you have to peer down at little code letters or symbols."

DEWAR'S SCOTLAND

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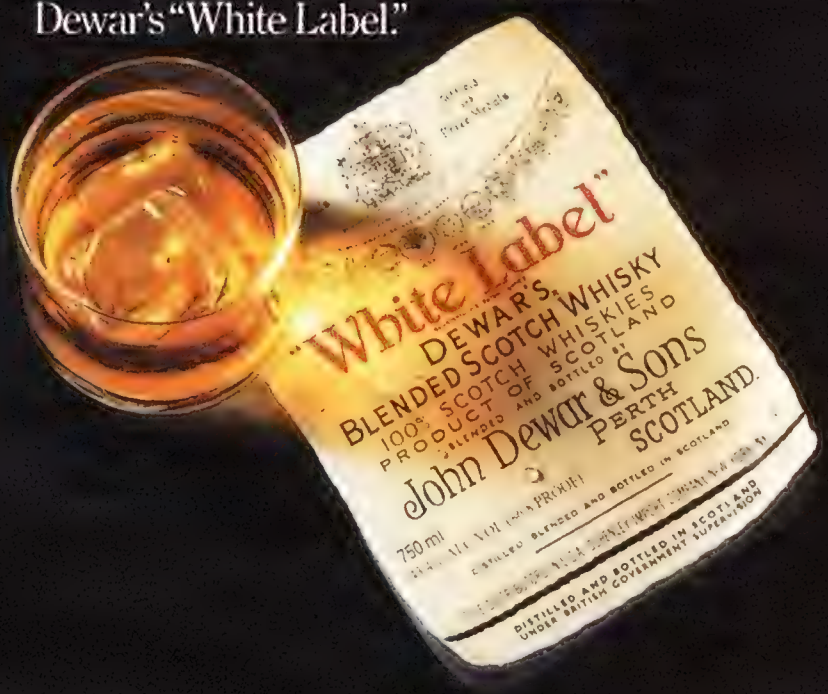

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In the "Smart House," a computer controls all kinds of things, from feeding the cat to adjusting the air-conditioning. But will it balk at some of life's grubbier chores?

"A VCR is designed by a technician or engineer," explains Norman. "He doesn't take into account that the average user lacks his specialized knowledge, and so you end up with rows of tiny buttons." It is that proliferation of buttons, readouts, dials and switches, as electronics comes to dominate the technological gene pool, that has brought the design issue to a head. When the scientific study of design began after World War II, it focused on "ergonomics," the fitting of products to the human body. But now, say the experts, the focus should shift to include the constraints of the human *mind*.

Melody Carswell, a professor of engineering psychology at the University of Kentucky, says that when she asks her classes to suggest design strategies for various consumer products, "the engineering students and the other students in the class have entirely different points of view." She says it isn't that engineers lack common sense, but that their common sense is different from that of nontechnical people because of their specialized education. James Zaiser, chairman of the mechanical engineering department at Bucknell University, agrees. "And the gap is much wider than it used to be in the Model T era because electronics are more abstract," he says. Or as futurist Arthur C. Clarke once put it: "Any sufficiently advanced technology is indistinguishable from magic."

But technological complexity is not the entire problem. Usually, industrial design is taught in art or architecture schools. As a result, many designers focus on esthetics instead of utility. "I gave talks in Japan on design, using a Ricoh camera as an example," says Don Norman. "It had black buttons on a black background. When the company was asked why, they said any other color scheme would spoil the looks."

A student designer recently showed Norman his prototype rack for toting carry-on luggage aboard airliners. "This fellow was an art student, and the rack was beautiful"—but when Norman pretended to use it in a narrow aisle while other passengers crowded impatiently behind him, he found it difficult to open. Says Norman: "The student was shocked that anyone would actually try to *use* the rack!"

We consumers aren't blameless—we're often dazzled by toggles and switches, the techie look. And many things we buy are for looks, not utility. It is technology as jewelry. "Why does anyone need a $5,000 watch that doesn't keep time any better than a $20 watch?" asks Norman.

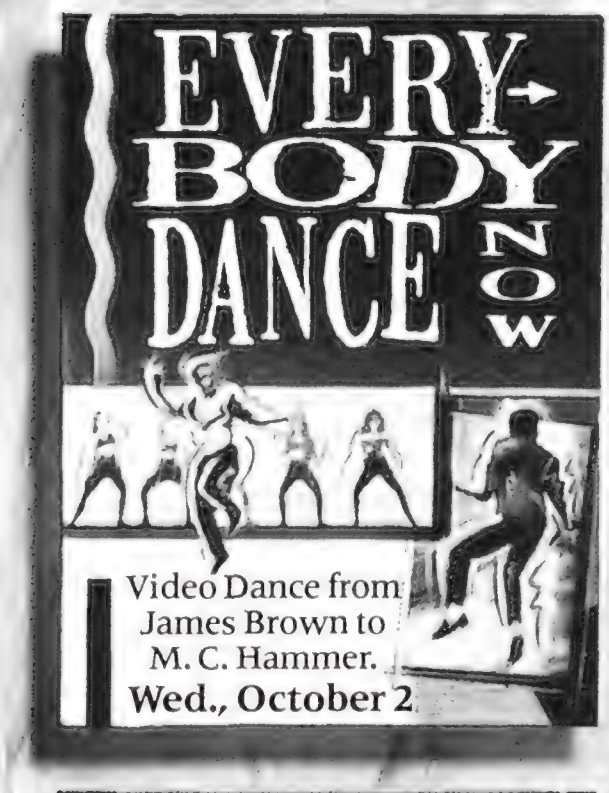
A few years ago his students studied photocopier design. They found that one of San Diego's top-selling photocopiers was ultracostly but virtually impossible to use. Mostly law firms bought it to display in their front offices for clients to see. "Nobody ever used those things to make copies—they were solely for appearances," Norman chortles.

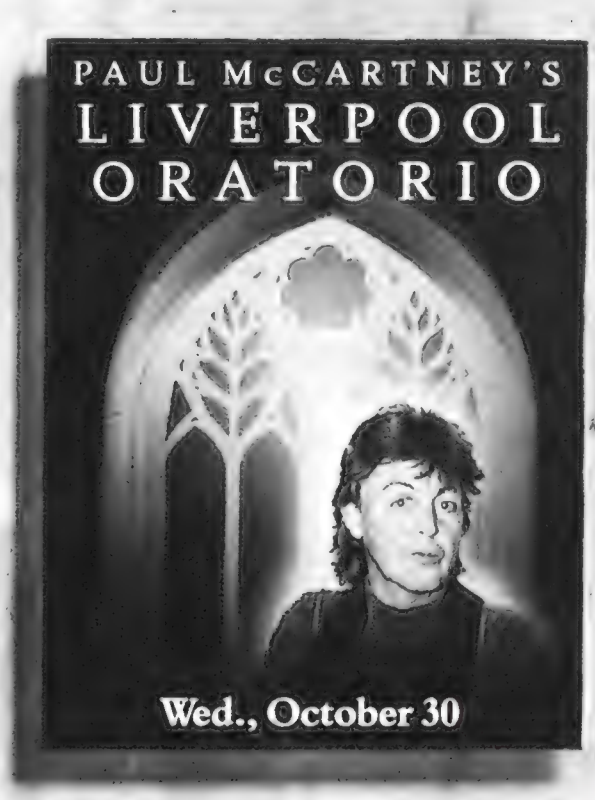
Still, mea culpas aside, bad design isn't our fault. In fact, it's often because the designers fail to consult us. "Whether consumers participate depends on how enlightened a company is," says Norman.

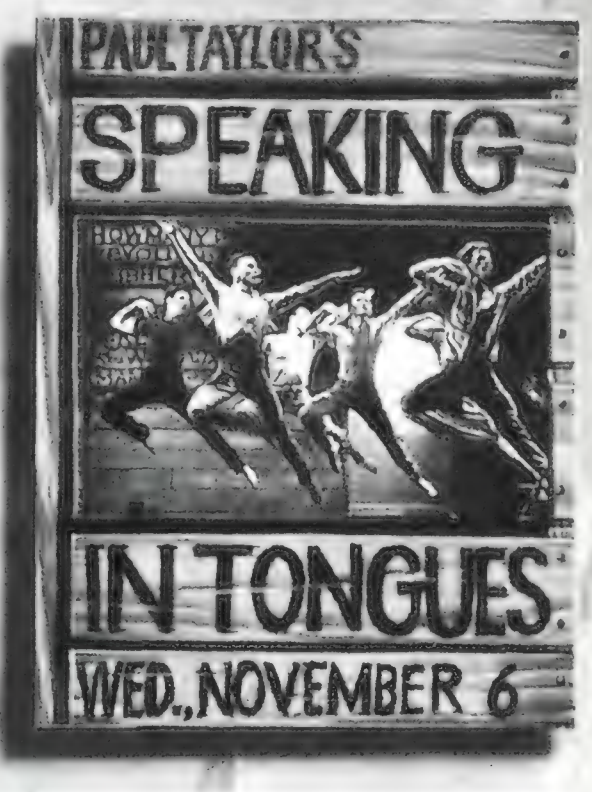
Not long ago, some Japanese auto engineers asked him to evaluate six prototype dashboard switches. They put the switches on his desk and waited eagerly for his opinion. "This isn't how you do it—you don't try them out on your desk," he said. Build a simulator, he told them. Let potential buyers drive it, trying out all

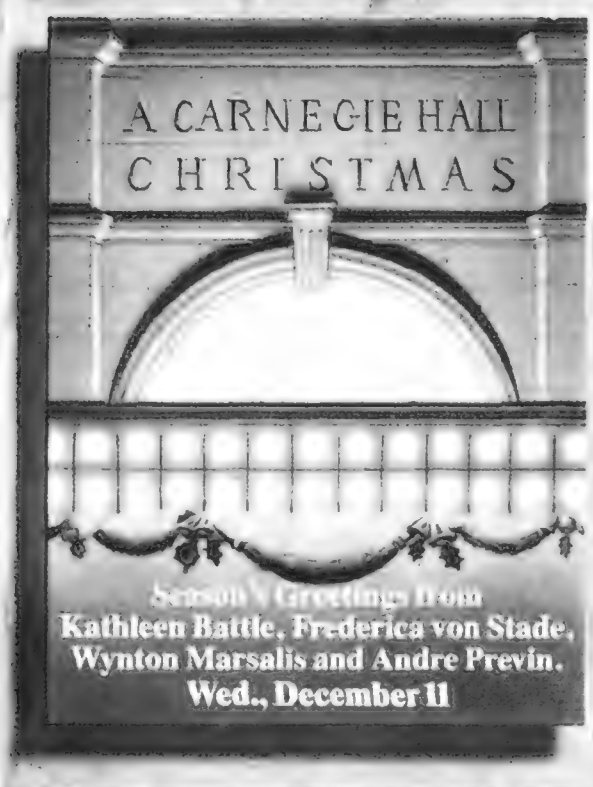
Great Performances

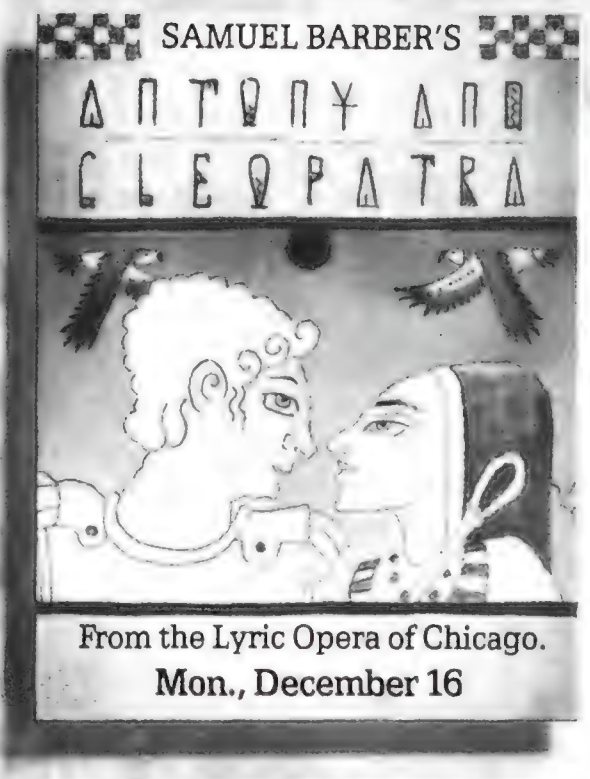
SPECIAL TV THAT GOES BEYOND THE "TV SPECIAL"

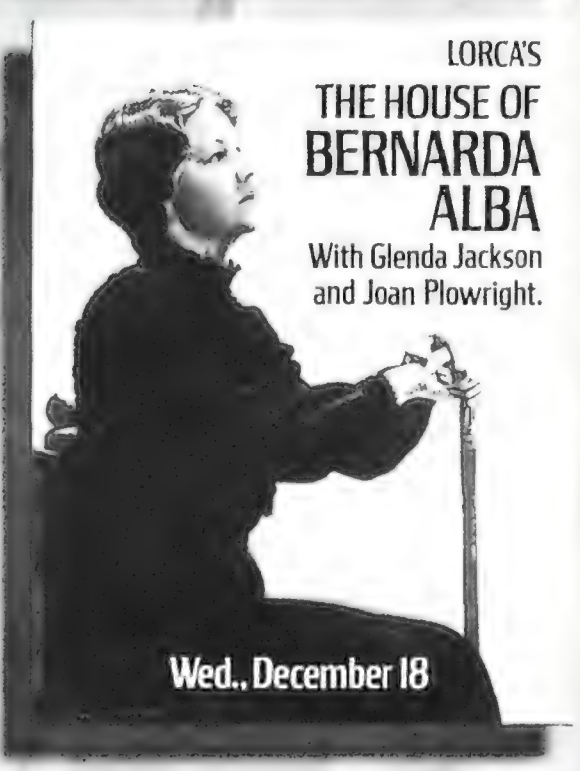


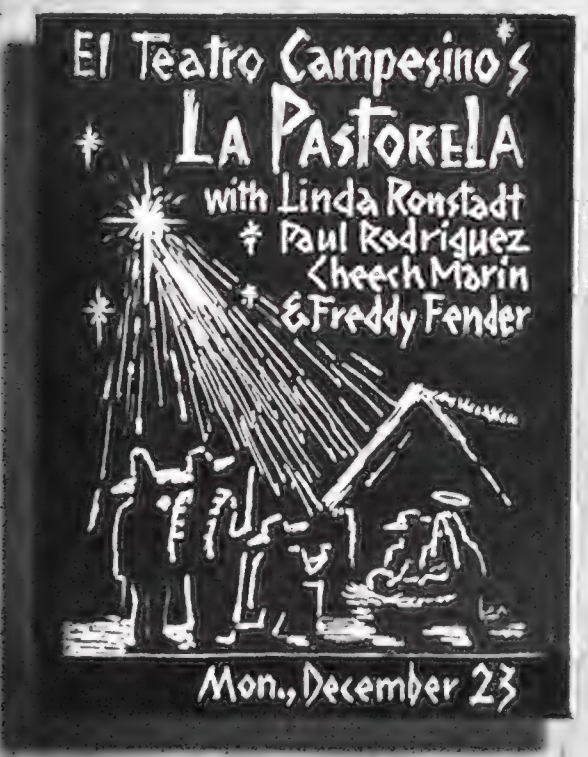


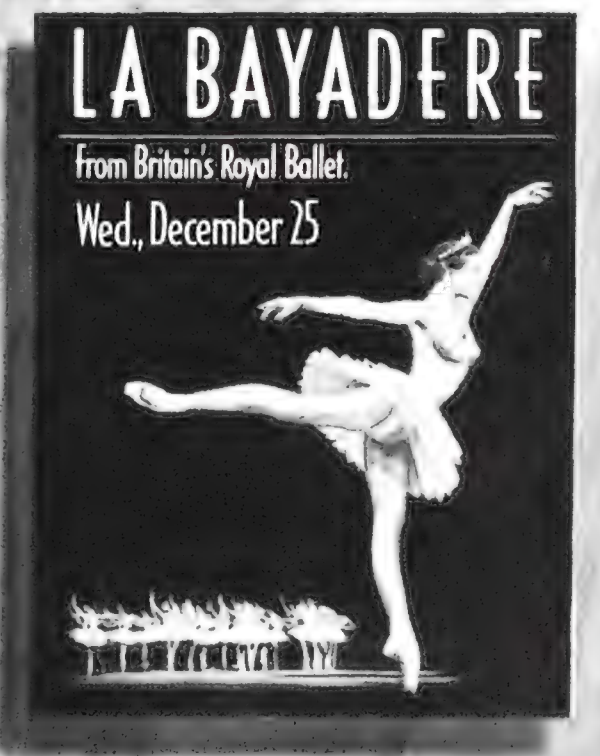












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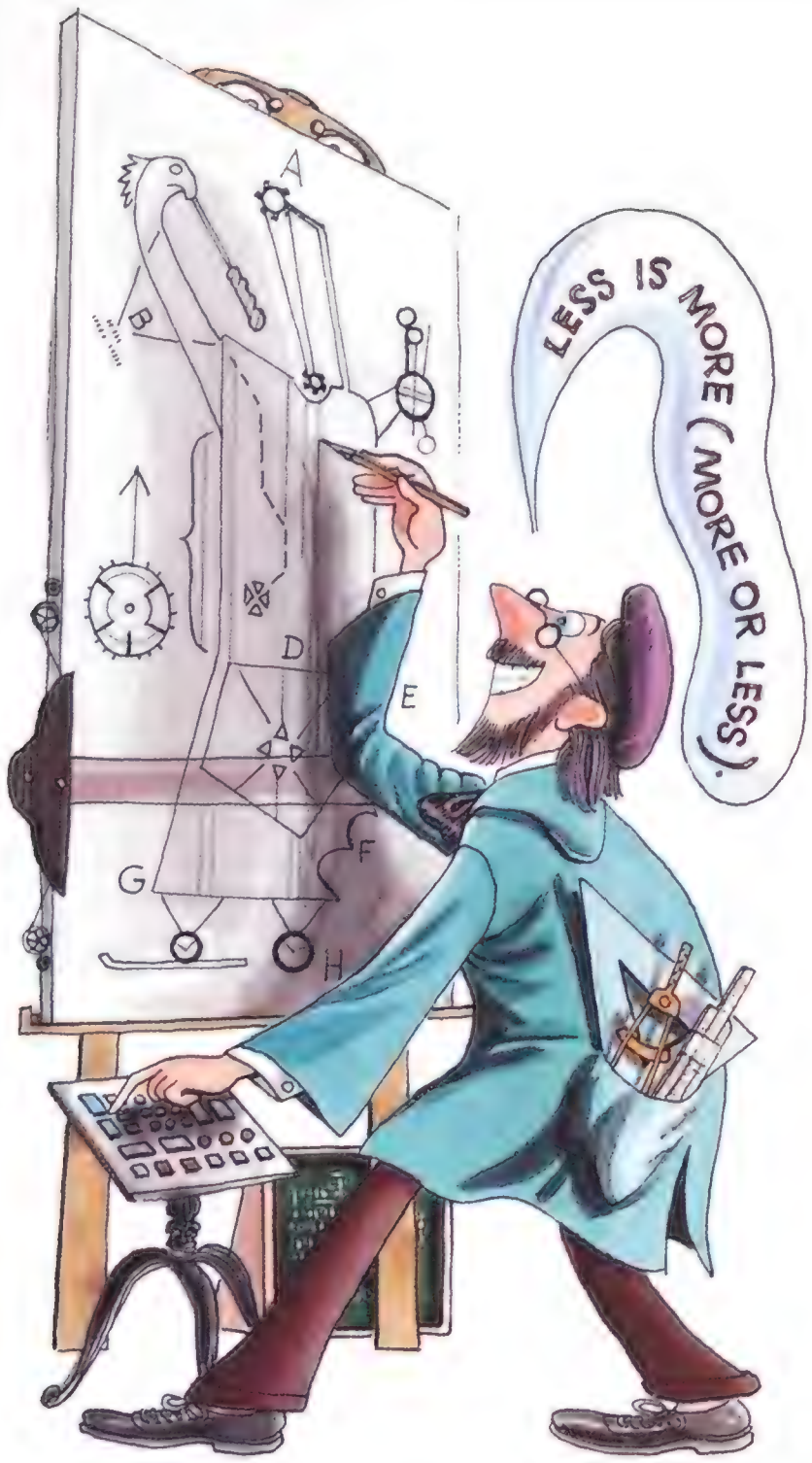


"Industrial design as taught in art or architecture schools focuses on esthetics rather than utility."

the different switches. What if they're wearing gloves? What if the kids are jumping up and down in the backseat? The engineers protested that a simulator would cost too much. Norman pointed to their own brochure, which showed a fancy simulator the company had built to test shock absorbers. "Shocks, yes, but designing for people was too expensive—that attitude is common," Norman says.

According to Thomas Hustad, a marketing expert at Indiana University's business school, one reason corporations often eschew consumer testing is to speed new models to market. "We've automated the design-and-delivery process so much that it can be faster to just keep putting out new variations of a product to replace ones that fail," says Hustad, who is past president of the Product Development and Management Association, an international group dedicated to improving the process of product innovation. Meanwhile, designers get techno-drunk. "They're carried away by the gee-whiz possibilities—it doesn't cost much to add this extra function, so let's throw it in," says Hustad. "The result is that technology is outstripping our ability to consume it." We confront the Swiss Army Knife Effect, in which a product performs so many functions you can't remember them all.

Consider my digital wristwatch: it gives regular time, military-style time, the day and date. It also sounds an alarm, serves as a stopwatch and times individual laps around a track. Three buttons control all those functions, and I dread changing the batteries because I can't remember the sequence in which to press the buttons to reset the time. "We're at a transitional point," says Hustad. "The next element for success in the marketplace will be simplicity—we've had our jolly fun with whizbang, and now we have to apply this power to the real world of the user."

Nerves already stressed to the max

He says one solution to our technology imbroglio is more technology. To illustrate, he points out that his office telephone has a 24-page guide to explain its 12-button keypad and its 18 additional buttons labeled with a scramble of abbreviations like DND, LNR, SNR and RLS, of which he actually uses only one. The answer might be a small screen on the telephone, giving step-by-step directions. Or when you buy an electronic product you might telephone the manufacturer's talking computer, which would walk you through the programming. Or the computer might program it for you, over the telephone wire.

Or—spooky thought—will the new technology just add more layers of complexity? "Frankly, I'm skeptical that such advances will solve the problem," says Laurence Feldman, gloomily predicting a future of ever more buttons and toggles. Meanwhile, our nervous systems may already be stressed to the max. "People get frustrated because they can't see how these things work," says Don Nance, a psychologist at Wichita State University. "I use a microwave oven and keep looking for the fire."

It's up to the designers—only they can save us from technological angst. Don Norman, despite his impatience with user-oblivious product design, thinks they're up to it. "I'm amazed that a good designer is aware of so many details," he says, pulling a cheap ballpoint from his pocket. "I count seven different materials in this pen, and look how the lines are straight here, then flared, then indented to fit your hand," he adds. "And here's a little hole to adjust for changes in atmospheric pressure—even a commercial airliner is only pressurized to about 8,500 feet; without that hole, ink would leak all over. I'm always

astonished a product ever makes it to the marketplace, let alone works at all."

He sees some breaks in the technological clouds. Recently a representative from Ricoh walked into his office to announce a major project to make the company's products more "user centered."

Norman also cites a new bandage for the VCR problem: a $60 unit that works with special multidigit numbers in TV program guides. If you want your VCR to record something, you simply punch its number into the unit's keypad. "It sends a signal to your VCR at the proper time and tells it to start recording," says Norman.

Remote controls may be getting saner, too. Mitsubishi recently came out with a cigar-shaped wand with only the basic buttons. Unfortunately, it omits the one Norman says is used the most: "Mute," for turning off the sound during commercials. "It has another problem, too—sometimes when you put it down it rolls away." The company also offers remotes with illuminated LCD readouts and buttons. And Sony now has a remote with just seven basic controls. "The one error—true of most remotes—is that they made the 'Power' button too easy to find, since you only use it to turn the set on or off, and you don't want to accidentally push it in the dark," complains Norman. Still, he sees encouraging signs that product design may be getting better. In response to disgruntled consumers, companies like Mitsubishi and Sony are working to make user manuals and TV on-screen instructions easier to understand.

Sure. But now that I've been Normanized, I want to know why nobody thought of all this a lot earlier—why the switch on my office lamp is mounted near the bulb, so that it gets too hot to touch. And why is the setting knob on my windup alarm clock so small, and so hard to turn, that I have to wrap it in the end of my handkerchief or use pliers? And why can't I figure out how to set the alarm on my digital watch?

I know, I know. I'm an anachronism from a primitive technological era when huge cars lumbered through the streets, displaying tail fins. But what of today's kids, children of the gizmo age? We often hear that they are born with button-pushing instructions encoded in their DNA, and it may be so.

I recently discussed that question with Gary and Carol Hobday. He is an engineer with a big computer firm; she is a technical writer. And neither of them can figure out how to stop their digital watches from beeping, or how to make their car radio work. But their preteen son, Chris, is so technically adroit he gives his parents tips on using their home computer.

Don Norman says young techno-hot-doggers like Chris only *seem* brainier than us button-phobic old techno-boobs. That's because they have no fear: they bop any button in sight just to see if the gadget lights up. And if it spits out transistors and then goes dark, no tears. They know the gadget fairy has an unlimited supply.

It might seem as if youngsters today are a bunch of techno-naturals, born with button-pushing instructions encoded in their DNA. Not so. Kids are just more ready than adults to push a button to see what happens.

Marble slabs from 400-foot-long frieze of altar depict "gigantomachy," mythic war between giants and the gods.

By Stanley Meisler

After the Wall, a national treasure is rediscovered

East Berlin's Pergamon Museum, home to a rare collection of Hellenistic art and architecture, now welcomes visitors from the Western world

Monumental sculpture, all original, was by only a handful of artists. Fragments here: from left, goddess

Moire battles giant; Athena grabs Alcyoneus by hair; giant gets the hoof from Triton; another is felled by lion.

For most of the postwar years, the great Pergamon Museum of Berlin was an obscure and largely forgotten treasure to most Americans and Western Europeans. The forbidding Berlin Wall that divided the peoples of East and West Berlin until the end of 1989 also divided the once renowned archaeological collections that graced the city. After waiting in line and paying a fee, a tourist could have entered East Berlin to see the Pergamon, once the best known of all the museums in Berlin. But most did not; it was simply too much trouble. The Pergamon—despite room after room of astounding, massive reconstructions of classical temples and gates—lost its standing as an archaeological rival of the British Museum and the Louvre.

Tales of the Pergamon's isolation sometimes defy belief. Max Kunze, an archaeologist who made his reputation sifting through classical ruins in Hungary and Romania, took over as director of classical antiquities at the museum in 1982. The Pergamon dominates what is known as Museum Island, also site of the Old, New and Bode museums, just off the Unter den Linden boulevard in East Berlin. It is only a ten-minute stroll from this island in the Spree River to the Brandenburg Gate, which opens on West Berlin.

Photographs by Evelyn Hofer

Alexander Conze, head of sculpture of Berlin Museums, sparked the Pergamon excavation, later joined dig.

Only a few miles farther on, at the Charlottenburg Palace, a visitor can find West Berlin's Classical Museum, a small, tasteful institution that specializes in Greek and Roman sculpture and possesses many pieces that belonged to the Pergamon collections before World War II. Yet, until the Wall came down, Kunze, in his entire life as archaeologist and museum curator, had visited the Classical Museum only once. And he had done so only by stealth—for the Communist government had put up the Wall to keep East Germans like himself from seeing the West.

"I know you Americans do not really understand this," the 46-year-old Kunze said in an interview in his dark, cluttered office on a floor beneath the great Pergamon Altar. "But it was forbidden for us to go to West Berlin without permission. I obtained permission in 1987 to do some research in the library there for five days. And I took advantage of that opportunity to rush over to the Classical Museum."

This isolation came to an end when the Berlin Wall was breached in November 1989, a historical moment of almost unbearable joy. The only obstacle to a walk between East and West Berlin now is the cluster of souvenir vendors at the site of the Wall near the Brandenburg Gate. They still hawk pieces of the rubble of the Wall, as well as East German flags, East German propaganda pins, East German license plates, and other remnants of a lost cause and a dead regime. With free movement between East and West, it is now possible to unite the archaeological and art collections of Berlin and expose them to a host of new, eager visitors. The Pergamon will probably benefit most from this. Buses crammed with American and European tourists already line up in front of the soot-darkened, fraying yet still imposing neoclassical building every morning. The world is ready to rediscover the Pergamon.

Ancient architectural wonders await those who enter. The museum takes its name from the great Altar of Pergamon, named for its site in what is now western Turkey, where a powerful Hellenistic colony ruled over vast lands of Asia Minor in the third and second centuries B.C. In an audacious archaeological coup—as notorious as Lord Elgin's acquisition of the marbles of the Parthenon—Carl Humann, a German engineer working in Turkey, came upon the marble slabs of the frieze of the altar in the late 19th century and shipped them back to Berlin. Museum archaeologists and artisans reassembled the frieze and then reconstructed much of the altar so that visitors—in a room that is now about 70 yards wide, 40 yards long and 20 yards high—could feel as if they were standing in ancient Pergamon itself.

The museum building brims with other massive architecture, such as the ceremonial walkway and Ishtar Gate of ancient Babylon, the Roman market gate of Miletus, and a host of Greek and Roman columns and facades. There is some controversy about all this. Modern archaeologists do not believe in reconstructing ancient architectural structures within a museum. If Humann had found his prize of marble slabs during the last half-century, no museum would have tried to rebuild and exhibit the great altar with modern materials. The idea strikes curators today as overblown showmanship and even a little dishonest. Despite this,

Stanley Meisler wrote about the pleasures of fin de siècle Paris in the August issue of SMITHSONIAN.
He is now UN correspondent for the Los Angeles Times.

Transporting lode from Pergamon acropolis to the coast was trial, hampered by rain and wandering beasts.

Carl Humann, engineer and archaeologist, discovered slabs of the altar frieze inside a Byzantine wall.

no one in Germany plans to dismantle the Pergamon Altar or any of the other reconstructions. "They are a monument to museology," said Dietrich Wildung, chief curator of the Egyptian Museum in West Berlin. "It would be a crime to change them." They are also a monument to German history, and no one can really understand the Pergamon Museum without understanding something of the history of the Germany that first asserted itself as a European power in the late 19th century. The Pergamon, in fact, probably tells us as much about modern Germany as about the ancient world.

In the middle of the 19th century, there was no such country as Germany; only, as a British lord put it, "a cluster of insignificant states under insignificant princelings." But in 1870 Prime Minister Otto von Bismarck led Prussia to victory over France and united various German-speaking states of Central Europe into an imperial Germany under the Prussian king, who was then proclaimed Kaiser (Emperor) Wilhelm I of Germany (SMITHSONIAN, March 1991).

Unification and victory over France made Germany one of the great powers of Europe, and Berlin one of its great cities. Germany then embarked on a period of uninterrupted industrial expansion. Germans streamed into Berlin, and the city became a dazzling showcase for theater, art and music. The university impressed the world with the caliber of its natural scientists, historians, sociologists and philosophers.

And yet, powerful as it was, the new Germany still felt it needed to catch up with the older European powers. A latecomer to imperialism, Germany made up for lost time in the ongoing scramble for Africa by grabbing pieces of territory that were left: Kamerun (modern Cameroon), South West Africa (Namibia) and Tanganyika (part of modern Tanzania). These colonies made Germany feel like a world power.

The 19th century was the age of museums, when European monarchs and states built immense structures in Gothic, Renaissance and other older styles to house treasures of art, natural science and archaeology. In this, Germany was not as far behind as it was in the hunt for colonies. The Prussian kings Friedrich Wilhelm III and Friedrich Wilhelm IV, probably inspired by the Louvre in Paris, had already built the Old Museum in 1830 and the New Museum in 1855 on Berlin's Museum Island to rival the museums of Munich and Dresden, and of other German states. After German unification, Kaisers Wilhelm I and Wilhelm II added a national gallery and an enormous baroque building now known as the Bode Museum to the island.

But these collections did not compare to the great collections of London and Paris. A Prussian minister of culture put it bluntly: "It is especially important that our museums, which have possessed only a few original Greek pieces, now acquire a work of Greek art that is identical or comparable in importance to those in the great collections of Greek and Asia Minor sculptures of the British Museum." To fill this gap, toward the end of the 19th century the Berlin Museums, supported by donations from industrialists and others, sent archaeologists throughout the world, especially to the Near East and around the Mediterranean, to dig

Reconstruction of altar's west front was intended to evoke original experience of the building with its soaring staircase and monumental frieze. Most of the frieze fragments are now displayed on museum's walls.

up treasures that had been overlooked by the British and French. It was an immense program of excavation, enabling Berlin to rival London and Paris as a center of archaeological research. When Humann found the Altar of Pergamon, glory was assured.

Humann, who had originally gone to the warmer climate of Turkey for his health, was named chief engineer of roads for the western Ottoman Empire in 1868, with headquarters in Pergamon. He is said to have lived like a pasha, overseeing 2,000 workmen, 1,000 oxen and 500 camels, horses and mules. An amateur collector of antiquities, Humann in 1871 discovered one of the slabs of the altar frieze embedded in a wall built in Byzantine times. "When I had blasted the wall down so far that we were close up to it," he wrote soon afterward in a letter to an archaeologist friend, "I personally carefully removed stone after stone and found the neck and chin, then the left cheek and the eye. When I saw the eye I cried out, *'That's a dead man!'* For this statue, although completely and beautifully sincere, definitely had the emaciated and stark look of death." After removing two more blocks of bluish-white marble sculpture, Humann decided they must be "part of a continuous frieze which showed a battle between men," a frieze that "could only have been part of a very important building. . . . I hope," the engineer went on, "it is not just the ecstasy of discovering something oneself which leads me to say that we have here a masterpiece of sculpture."

Humann sent the few marble slabs to the Berlin Museums, where their significance was not understood until Alexander Conze became director of sculpture

in 1877. Researchers persuaded Conze that Humann's slabs must belong to the long-lost altar described by the Roman historian Lucius Ampelius. "At Pergamon," Ampelius wrote in his survey of world wonders, "there is a great marble altar, 40 feet high, with colossal sculptures, representing a battle of the giants." Conze, promising funding and support, urged Humann to resume excavations and find the altar on behalf of the Berlin Museums.

There was little doubt that Humann looked on this as his patriotic duty to the new Germany. The Crown Prince, who later ruled Germany as Kaiser Friedrich for only 99 days before dying of cancer in 1888, was then sponsor of the Berlin Museums. After leading 14 workmen up the acropolis of Pergamon, Humann held up a pickax and proclaimed, "In the name of the Protector of the Royal Museums, the happiest and most beloved of men, the warrior who has never been vanquished, the heir to the most illustrious throne in the world, in the name of our Crown Prince, may this work be attended with fortune and success." The workmen, Humann wrote later, "thought that I was reciting a magic spell and they were not far out."

In three days, Humann and his workmen came upon a host of other slabs of the frieze embedded in the Byzantine wall and also the foundation of the altar that was beneath the wall. "We have found a whole epoch of art," he said. "The greatest work to have survived from antiquity is here beneath our hands." Conze joined the dig a year later. After 18 months of work, Humann and Conze had found 97 marble slabs and 2,000 fragments of the main frieze, 36 slabs and 100 fragments of a smaller frieze, and a host of statues and architectural pieces. They had to dig out the marble pieces, carry them down from the acropolis by buffalo cart on a makeshift, serpentine road, transport them 18 miles to the sea, and load 462 cases of the treasure onto German boats. Humann had little trouble getting the cases past Turkish customs. At first, the Ottoman government demanded two-thirds of the finds, then only one-third, and finally, for a 20,000-mark payment from the German government, agreed to let it all go. To make sure that Ottoman officials would not change their minds, Humann hid the beauty of his find from them by placing the slabs face down. When Humann visited Berlin a year later, his compatriots hailed him as a conquering hero.

An imperial symbol for the city of Berlin

The excavations of Pergamon did not stop at the altar. Conze dispatched architects and archaeologists to Pergamon to help Humann dig out the rest of the city. Turkey, a military and political ally of Germany's, became the preserve of German archaeology. According to Max Kunze, late 19th-century Germans saw a parallel between the new German empire and the ancient Hellenic empire of Pergamon. They looked upon the Altar of Pergamon as "the grandiloquent monument to the monarchical spirit" and believed it a fitting and proper symbol to have in the powerful, imperial city of Berlin.

Much like Germany in 19th-century Europe, Pergamon was a latecomer to the ancient Greek world. After Alexander the Great died at the age of 33, in 323 B.C., his vast Greek empire split into three parts, with the Ptolomies in Egypt, the Selucids in Syria and the Antigonids in Macedon. Pergamon, built on a hill fewer than 20 miles from the Aegean seacoast, had been settled as a colony by Greeks known as Attalids. Gaining independence from the Selucids, the kings of the At-

talids, supported by the Romans, expanded their territory and asserted themselves as a great military and economic power in the Aegean. The Attalids looked on themselves as the natural heirs of classical Athens, which had gone into eclipse more than a century before, and set out to transform Pergamon into a city that would rival the Athens of the Golden Age of Pericles in science, culture, art and, above all, architecture.

Following the tradition of the Athenians, the Attalids built on the Pergamon acropolis a royal palace, a library of 200,000 scrolls (parchment is said to have been invented in Pergamon), a temple to Dionysus, a sanctuary for the worship of Athena, a fortress, an agora, a Greek amphitheater and, finally, in the second century B.C., the magnificent altar that is now partially reconstructed on Museum Island in Berlin. It was the last great work built at Pergamon before the death in 133 B.C. of the last Attalid king, who bequeathed his vast holdings to the Roman republic. Pergamon then went into decline as an Asian province of Rome.

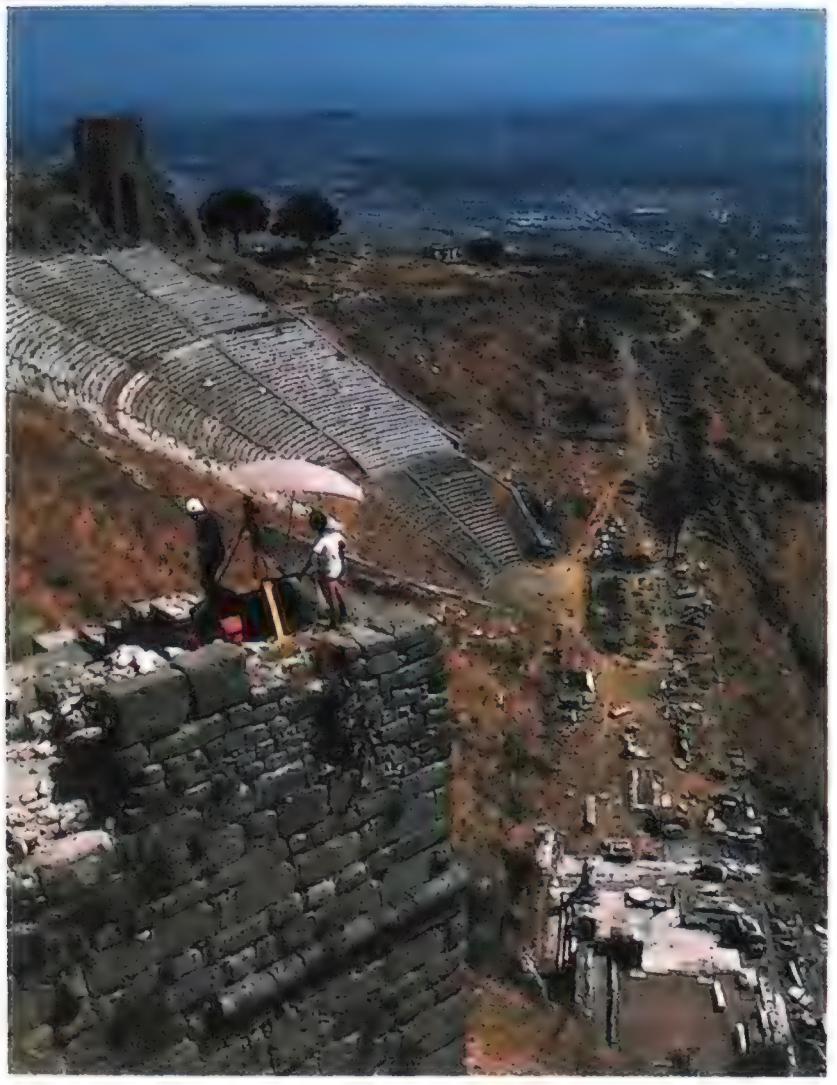
The altar was built as a tribute either to the goddess Athena or to both Athena and the god Zeus after the Attalids defeated the Galatians (also known as the Gauls) in 184 B.C. In their sculptured decoration of the altar, the Attalids depicted scenes from Greek mythology to symbolize their own victory in battle. They chose the epic drama known to the Greeks as the "gigantomachy"—the mythological war between the terrifying giants of Earth and the gods of Olympus. According to the legend, the gods could not win unless they enlisted a lion-skinned mortal on their side. Heracles, the strongest man on Earth, rushed to the salvation of the gods, standing next to Zeus himself as they slew the giants, who appeared in fearsome forms with wings, serpentlike legs and the heads of beasts. The tense and torrential struggles of these superhuman figures, sculpted in sumptuous and intricate detail, covered the roughly 400 feet of marble frieze that surrounded the altar. "In terms of sheer technical brilliance," the British classicist Roger Ling has written, "the gigantomachy frieze marks the climax of Greek sculpture." Byzantine conquerors tore down the altar in the eighth century A.D. and used the marble as building material for a wall. The slabs from the magnificent frieze, by some 16 mostly unknown artists, remained embedded in the wall until freed by Humann more than a thousand years later.

In choosing to honor Heracles as the hero in the frieze, the Attalids identified themselves even more closely with Greek tradition, for, according to their mythology, the city of Pergamon was founded by Telephus, the son of Heracles. To commemorate this event, the Attalids set another frieze—smaller and less tempestuous than the outer one—within the sanctuary high on the top of the altar. This smaller frieze tells the story of the virgin priestess Auge who, raped by Heracles and condemned by her father, manages to give birth to Telephus and hide him in a thicket before she is put out to sea in a boat. Telephus, suckled by a doe, is later rescued by Heracles and, while traveling far and wide in search of his mother, founds the city of Pergamon. Most of this frieze was also uncovered by Humann and sent to Berlin.

For visitors, a sense of majestic Pergamon

German archaeologists and architects, helped by some lettering on the slabs, meticulously fitted together the pieces of the Pergamon friezes for exhibition at the Old Museum and later at the New Museum. Germany now had a classical treasure of great beauty and historical significance to match and perhaps surpass those of Britain and France. But, not content to display the sculptures on their own as the British Museum did with the Elgin marbles, the Germans decided to build a replica of a part of the great altar so that visitors could sense the majesty of imperial Pergamon itself. It was as if Britain had replicated part of the Parthenon within the British Museum to evoke the Golden Age of Athens.

Elisabeth Steiner



At Pergamon, topographers set up shop to do site plan. Theater on western slope was dedicated to Dionysus.

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Modern model of terraced acropolis shows the entire altar with frieze (on white plaza, left). Above the altar are the Roman-built Trajan temple with colonnade (top center) and a complex of royal palaces at peak.

"It was a very new idea," says Kunze, and it caused great controversy. "There was a long debate about it that we now call the First Berlin Museum War."

Many archaeologists and museum curators believed, even then, that a museum should show only original pieces and not attempt to fit them alongside new material into a reconstructed work of architecture. Moreover, Kunze says, critics thought that such reconstructions within a museum were giving "too much space to ancient architecture." Critics notwithstanding, the Germans decided to create a massive museum of archaeological architecture with the Pergamon Altar as its main attraction. Construction was slow, hampered by World War I, a continual shortage of funds and the constant harping of critics. It was not until 1930 that the huge Pergamon Museum—the newest on the island and the only museum in the world with such large-scale reconstructions of ancient architecture—opened its doors to the public.

The doors remained open only nine years. With the onset of World War II in 1939, the Germans closed the Pergamon and put layers of sandbags around the marble slabs of the friezes. By 1941 museum officials realized that sandbags would not be of much use under heavy Allied bombing. The slabs were removed and buried in an underground bunker beneath the Reichsbank and then in an antiaircraft tower in the Tiergarten park near the Brandenburg Gate. Allied bombs did not demolish the museum, but the altar was heavily damaged. Later, when Soviet troops captured Berlin at the end of the war in 1945, they discovered the hiding places of the slabs and carted them off. Still later, when East Berlin became the capital of Soviet-dominated East Germany, the Soviet Union no longer had justification for withholding the slabs. They were returned to the Pergamon in 1958; by 1959 the East Germans had rebuilt the altar and reopened the museum.

A wisp of an Elgin-like cloud hangs over the Pergamon marbles. For decades, the Turkish government has tried, somewhat halfheartedly, to get them back, insisting that the old Ottoman regime should not have let them go. But unlike the Elgin case, the Ottomans had not permitted the plunder of the marbles from an occupied nation like Greece, but from Turkey itself.

"It's a sad story for our country," says Samiye Yavuz, a trained archaeologist who is an attaché at the Turkish Embassy in Washington. "Turkey cannot make an official complaint. It was a legal contract in the 19th century. All Turkey can do now is make its wishes known. We believe that all monuments should remain

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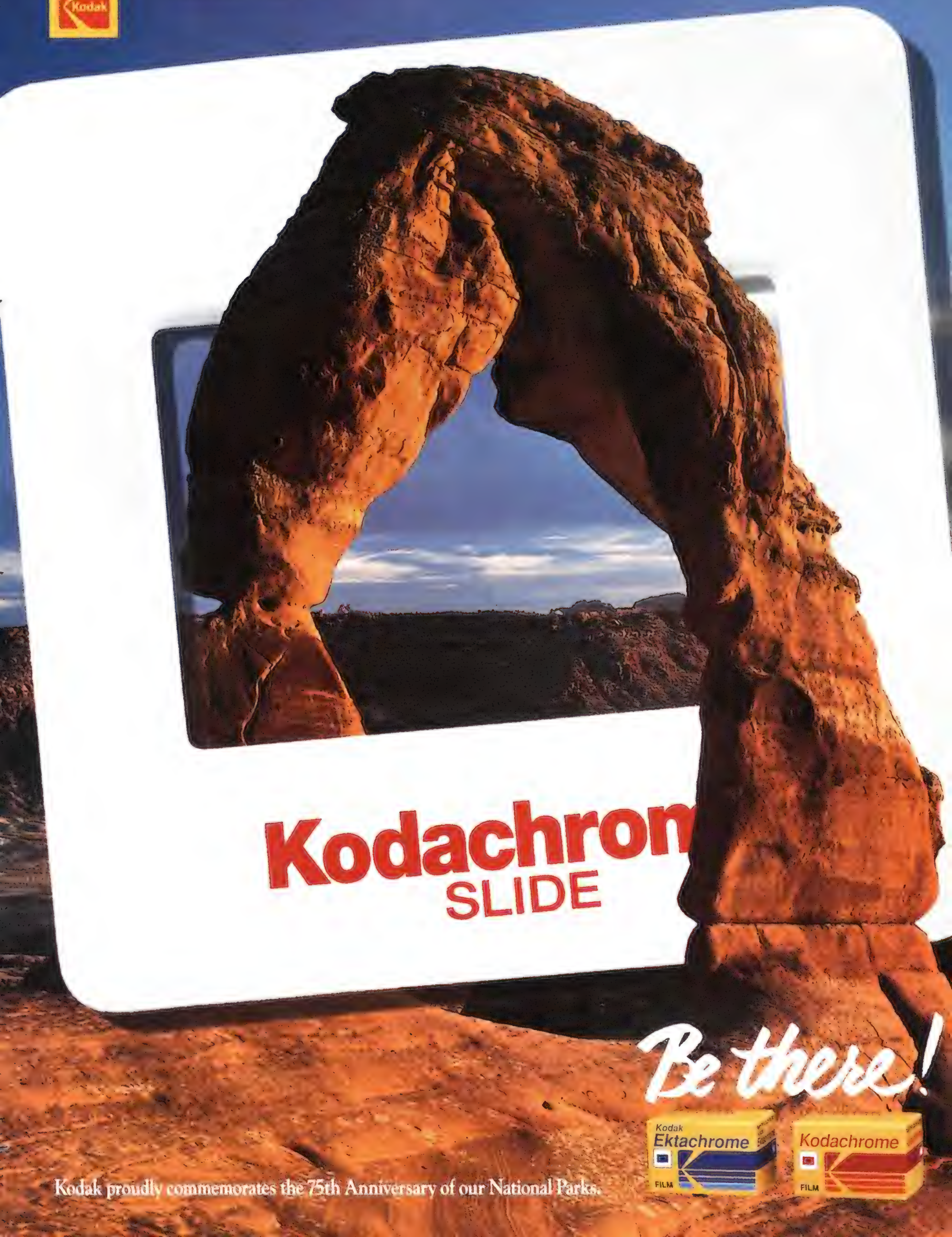

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Entry gate from Roman market town, Miletus, in western Turkey dates from second century. Ruined in an earthquake c. 1100, it was found at the turn of the century and restored in Berlin.

in place. If you take away an important piece from an ancient archaeological monument, future generations cannot imagine what the site was like at all."

At the Pergamon, however, Kunze sees no merit in the Turkish request. "All these pieces came here under official contracts between the Turkish and German governments," he says. "In any case, you can exhibit these 100 frieze slabs only in a museum. If Turkey brought the altar back, they would just be moving it from one museum to another. That makes no sense." In the past, Turkey, as a member of the North Atlantic Treaty Organization, did not have the best of relations with East Germany, a member of the Soviet-dominated Warsaw Pact. But now that the altar belongs to a unified Germany, a fellow NATO partner, Turkey will surely press its case for the return of the marbles with more ardor.

A visitor entering the main hall of the Pergamon for the first time encounters a spectacular sight, a flush of long, white steps soaring upward toward an altar guarded by stately Greek columns. The experience is overwhelming, for it seems as if a great structure of Hellenic civilization is standing there, in all its glory and beauty, right inside a museum. In a few moments, however, it becomes clear that only the west side of the altar—perhaps a third of the structure—has been erected. It takes a little more time for a discerning observer to realize that only a few of the columns and cornices and steps are composed of the original marble. Most are replicas fashioned by German hands to create the illusion of the ancient Pergamon Altar. The great art and beauty of Pergamon lie in the frieze that once decorated the altar building on all sides. But, since the entire building has not been reconstructed, the museum cannot show all the frieze as it was originally. Most of the marble slabs are therefore exhibited on the museum walls near the altar. These slabs, rather than the breathtaking reconstruction of the west facade of the altar building, are the real treasure of the Pergamon.

The Pergamon marbles are neither as finely crafted nor as well preserved as the Elgin marbles sculpted under the supervision of the great Phidias in Athens nearly three centuries earlier. But that does not diminish their power or beauty: the Pergamon marbles with all their fury and writhing are a glory of ancient Greek civilization. They are surely one of the most astounding finds of 19th-century archaeology.

Humann did not uncover every piece of the frieze. Moreover, some sculpture was too shattered to fit together again. The paw of the lion skin of Heracles, for example, is all that remains of the powerful mortal who fought on the side of the gods. But the slabs, buried in a wall for a millennium, are still preserved enough to depict wonderful scenes of Zeus about to strike down the giant Porphyrion with a thunderbolt; Athena seizing the hair of the desperate giant Alcyoneus who will die if pulled from the Earth; the tri-bodied goddess Hecate slaying a bearded giant with a

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Director of classical antiquities Max Kunze poses with one of his charges, an original Hellenistic sculpture.

torch and a lance and a sword; the triumphant Artemis, the virgin huntress, felling a giant with her hunting dog; her daughter Asteria wielding a two-edged sword and loosing her dog against monstrous foes; a giant, with the neck of a bull and the legs of a serpent, bending under the thrust of a knife into his chest; the Titan goddess Phoebe defending herself with an enormous torch; a fearful giant arching back from the terrible blows of the horselike hoof of Triton, the god of the sea; and a host of other battles of the gods.

Despite its name, the museum has far more than the great altar and frieze, and a visitor, when sated with the splendor of ancient Pergamon, can step into other enormous rooms to find more reconstructions. The best known are probably the Processional Way (p. 90) and Ishtar Gate of ancient Babylon in the reign of King Nebuchadnezzar II in the sixth century B.C. The brickwork of these striking structures was excavated from a site near Baghdad from 1899 off and on until World War I in another deliberate attempt by German archaeology to catch up with British and French.

The Germans have tried to show what it was like for a Babylonian to march down the walled walkway and pass through the Ishtar Gate toward the heart of the city and the palace in the biblical kingdom. The walls of both the walkway and the gate are decorated with blue and gold molded bricks that create wondrous sculpted lions, dragons and bulls—all symbols of gods. Although the walls are mostly made up of modern German materials, the animals themselves have been pieced together from the original Babylonian bricks. And so has an inscription in cuneiform that begins, "Nebuchadnezzar, King of Babylon, the pious prince . . . the highest priest . . . the never tiring governor . . . the wise and humble man, the trustee of Esagila and Ezida [two religious shrines], the first-born son of Nabopolassar, King of Babylon—am I."

A special moment awaits those who decide to spend some time in the Roman room between the Pergamon and Babylonian monuments. At the turn of the century, Theodor Wiegand, an archaeologist protégé of Humann, decided to make the uncovering of Miletus in Aegean Turkey a special project of the Berlin Museums. The city, the birthplace of the Greek city planner Hippodamus, had over the centuries passed through Persian, Hellenic, Roman and Byzantine hands. Unfazed by this complexity, Wiegand and his diggers had by 1910 laid bare the center of the city. Their most striking find was probably the ruins of the finely decorated, two-story, columned Roman market gate built in the second century A.D. An earthquake had crumbled the structure sometime about the year 1100. Wiegand and his associates uncovered every stone and took them back to Berlin, where the Miletus Gate was carefully reassembled to its height of 46 feet; it was finally placed in the Pergamon. In the view of museum specialists like the Egyptian Museum's Dietrich Wildung, it is one of Germany's great prizes of archaeological architecture.

A very old fantasy comes true

When the two Germanys and the two Berlins united, curators knew that their museums would unite as well but were unsure how that would be done. "It had been in our fantasies for a very long time," said Wildung. "We had been discussing the union of these museums with our colleagues from the East for decades. But when it finally happened, we were not prepared." They quickly agreed on one general principle: all the archaeological collections of Berlin were to be assembled on Museum Island and centered around the Pergamon. The timing partly depends on how long it takes workmen to rebuild the island's 136-year-old New Museum, bombed to ruins during World War II and only now under reconstruction. A single archaeological center will offer tourists the convenience and excitement of seeing Berlin's two most popular archaeological attractions on the same visit: the 3,000-year-old bust of Queen Nefertiti by the great Egyptian

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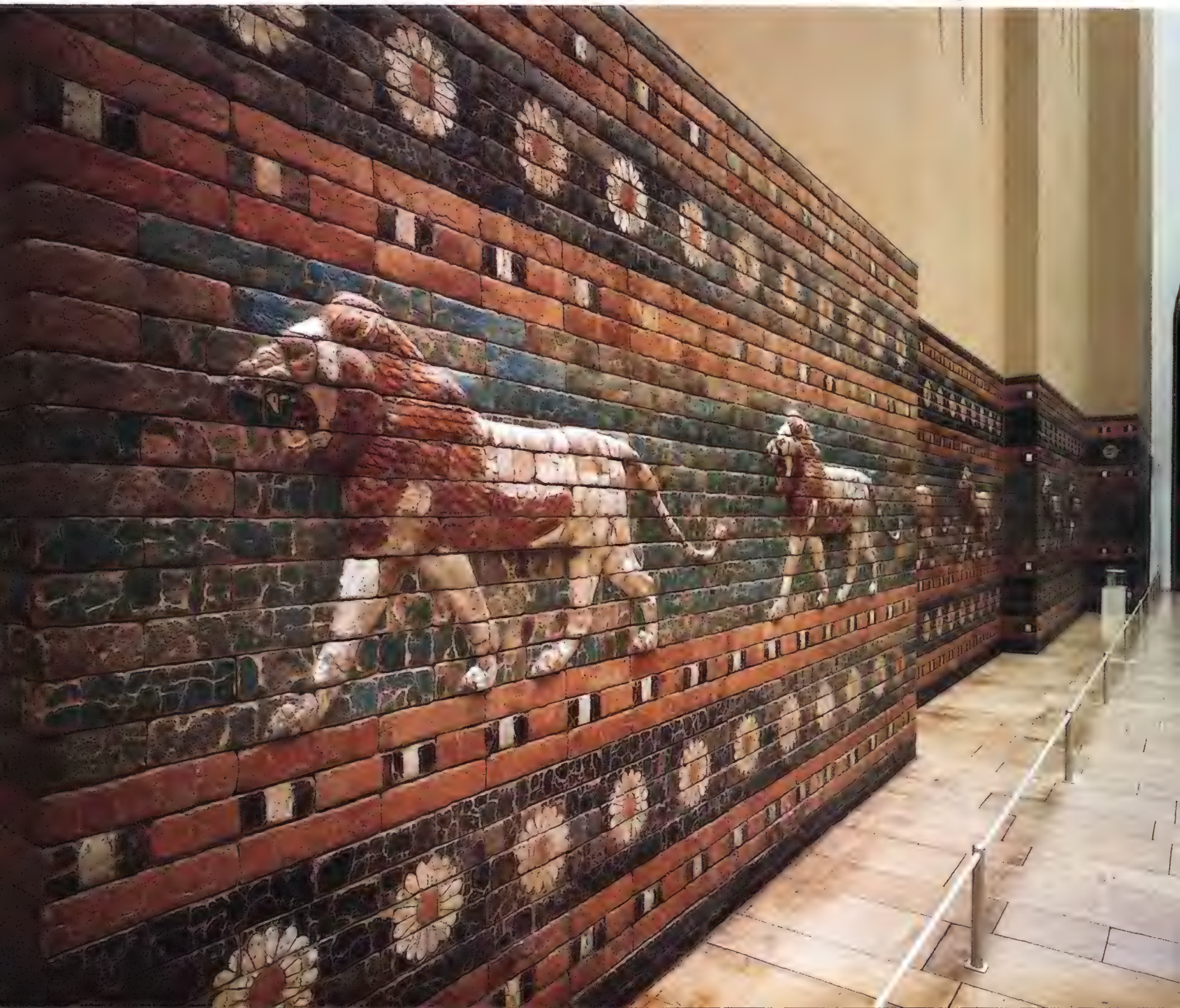
sculptor Tuthmosis, now in West Berlin, and the great Altar of Pergamon, currently in East Berlin.

Cooperation will not be difficult. West Berlin curators had been crossing the Wall to meet East Berlin curators in the privacy of their homes for years. Kunze, for example, helped West German curators mount an exhibition about Carl Humann in the city of Essen in 1988. "But it was a secret that we were putting it on together," he said. Unification does present one knotty and depressing problem. The terms of the treaty of unification protect the jobs of West German civil servants but not those of East Germans. Kunze estimates that once the museums in Berlin are united, about 120 of the 600 East Germans on the staffs will have to be dismissed. "There is a lot of worry," he said.

Kunze has another worry as well. Even before the Wall was breached, the Pergamon Museum attracted 1.5 million visitors a year. Once the Wall was down, crowds of Westerners began rushing to the Pergamon every day. Yet these crowds have not swelled the total of visitors very much. For the most part, the new tourists have taken the place of visitors from the Soviet Union and Eastern Europe who can no longer afford to travel to Germany now that they must buy expensive Deutsche marks with their own weak currencies. This troubles Kunze. "Berlin should be a center for all of Europe, East and West," he says. Kunze is surely right, but it is a problem that only time and difficult economic decisions will resolve. In the meanwhile, at least Americans and Western Europeans can enjoy a splendor denied to most of them for the three decades of the Berlin Wall.

Walking the Processional Way toward Ishtar Gate draws the modern visitor back into Babylonian times. Brickwork is largely 20th-century; lions are all original. The lion was symbol of the goddess Ishtar.



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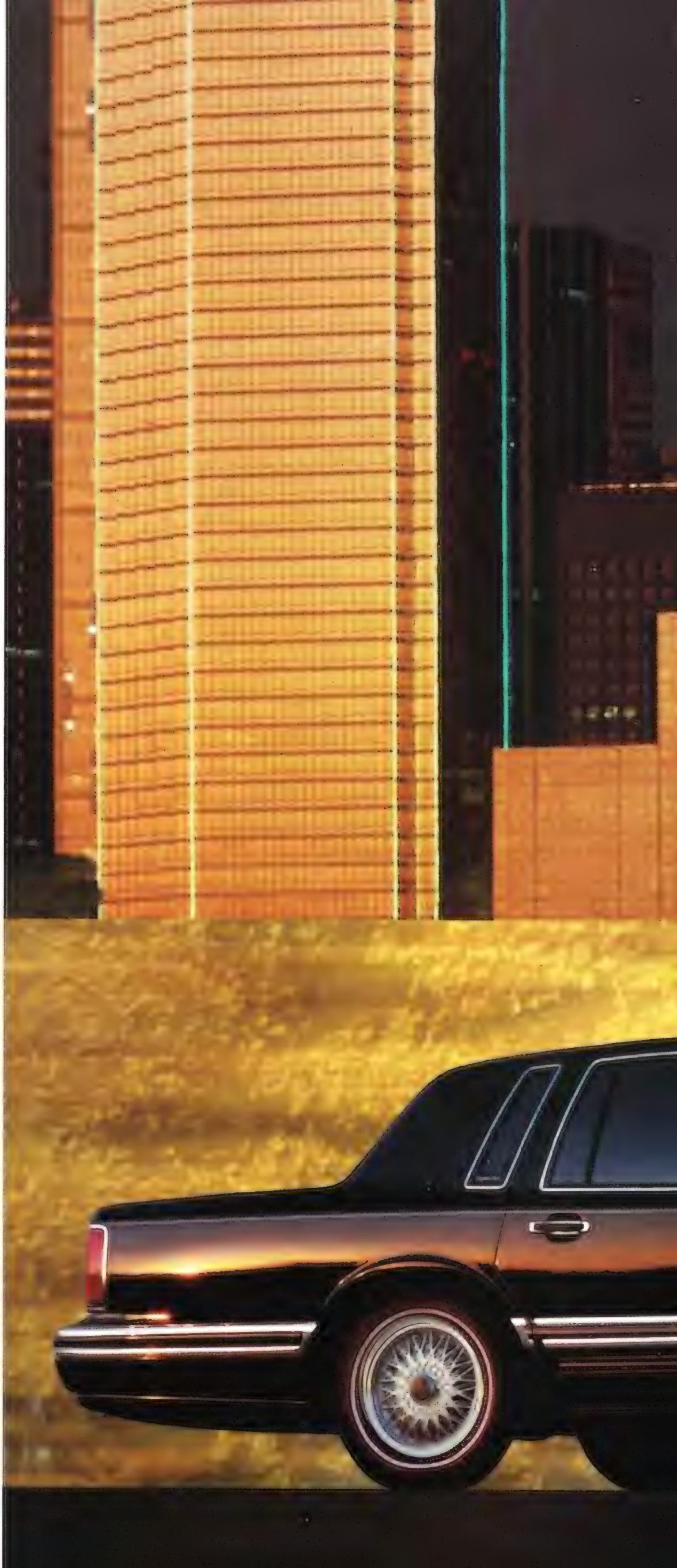

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Gulf Coast Cruise *March 28-April 11*
Miami to New Orleans.

Arizona in Spring *April 1-9*

New Orleans and Natchez *April 5-12*

Sojourn in Sedona (Arizona) *April 9-15*

Jefferson's Virginia *April 10-16*

Grand Canyon Weekend *April 23-26 or May 7-10*

Delaware Valley *May 1-9* Spring gardens.

Okefenokee Swamp *May 3-8* Canoeing.

New York: Ellis Island *May 7-10*

Hudson River Valley *May 10-15*

Foreign Study Tours

London Interlude *October 31-November 9*

City Interludes *November-April* Lisbon, Lhasa, Prague, Budapest, Barcelona, Hong Kong, Florence, Kyoto, Leningrad, Santiago/Buenos Aires.

Mexico's Copper Canyon by Train *November 30-December 7*

Treasures of Costa Rica *December 2-17*

Christmas in Canterbury *December 20-January 3*

Christmas in Switzerland *December 21-January 1* Bern and Basel.

Baroque Winter *December 27-January 7*
Munich, Salzburg and Vienna.

Mesoamerican Study Programs *January-March* Yucatán, Oaxaca, Guatemala.

South America Cruise *January 8-28*
On the *Seabourn Pride.*

Indian Wildlife *January 12-February 6*

Dominica *January 13-21*

NEW Rembrandt *January 13-22* Amsterdam.

USSR Performing Arts *January 17-30*

Moscow-Leningrad *February 3-14*

Kenya-Tanzania *February 5-23*

Dominican Republic *February 9-19* Whale watching.

Far East Adventure *February 11-March 3*

Australia-New Zealand Cruise *February 20-March 13*

Reindeer Safari *February 23-March 3*

Chile-Argentina *February 29-March 14*

Treasures of Mughal India *March 3-23*

Alpine Snow Train *March 5-17*

Red Sea Passage *March 5-18*

Patagonia to Lisbon Cruise *March 12-April 15* Aboard the *Illiria.*

Papua New Guinea *March 13-April 2*

Australia-New Zealand *March 15-April 4*

Indonesia Cruise *March 20-April 6*

Sea of Cortés Cruise *March 29-April 6*

Budapest, Prague and Berlin *April 1-12*

Morocco *April 4-18*

Durham (England) Country Stay *April 6-16*

Dutch-Belgian Cruise *April 11-30*

Central Asia (USSR) *April 12-23*

Costa Rica Cruise *April 14-27*

Galápagos Cruise *April 18-29*

Castles and Cathedrals of France *April 18-29*

Treasures of the Nile *April 19-May 6*

Textiles of Portugal *April 26-May 9*

Crete, Rhodes and Santorini *May 1-16*

USSR Golden Ring *May 3-17*

NEW Kent: The Garden of England *May 7-19*

Czechoslovakia *May 7-22*

Italy Cruise *May 9-26*

NEW Scotland's Highlands and Northern Isles *May 29-June 14*

NEW Lake District (England) *June 2-12*

Inside Ireland *June 12-22*

Hikes in the French Alps *June 14-27*

Turkey *June 18-July 1* On the *Sea Cloud.*

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Private collection

By Bennett Schiff

'Let's go get drunk on the light once more'

Seurat thought that he was being scientific; maybe he was, but his passion comes through in the exhibition now on view at the Met

Seurat came to the point in much more than a figurative way. The inventor of what came to be called Pointillism, he preferred the word "divisionism" as being more descriptive, which it is. What he sought to do was to juxtapose points, patches, flicks, commas of color, both in opposition to, and in harmony with, one another in an effort to obtain a brilliance and luminosity unseen in the art of painting before then. In effect—by meticulously applying the science of optics and the chemistry of color according to the theories of the time—he sought to paint with drops of light.

A vicious outbreak of diphtheria in Paris in 1891 claimed him as a victim. He was just 31. His adult professional life as a painter had lasted a scant ten years. As with his contemporary Vincent van Gogh, a white-hot decade of intense and feverish work, as if he had been plunged into a crucible, was enough to establish him as one of the fundamentally significant artists of his century. With genius, ten years can be long enough to make an indelible mark on history. But longer would have been better.

The chances are that if he had had less pure blazing talent, the young Georges-Pierre Seurat would have been a single-subject bore, the subject being painting—his painting. There seemed to be nothing else in his life. At the very least, he was obsessive to just this side of fanaticism. What saved him from that fate (reversing Santayana's memorable definition of the fanatic) was the fact that, although he may have redoubled his efforts, he never forgot his aim.

Seurat's work is spread around and there is no single place where one can see a full representation of it. It is a rare treat, then, to have the largest Seurat show ever put together now on view at the Metropolitan Museum of Art in New York.

Notwithstanding Stephen Sondheim, "Sunday in the park with George" was no picnic. Sunday in the park, or any other place, was work, as was very nearly everything else in his life going back to his childhood, if it could be called that. He seems to have metamorphosed from infancy directly into grave and formal adulthood, skipping any stops in between. If Georges was in the park on Sunday, he was also there on Monday, Tuesday, Wednesday, Thursday, Friday and Saturday, eavesdropping, looking, sketching. Voyeurism in a painter is, after all, normal enough. And then, always, back to the studio, working deep into the night, not needing daylight, having captured it in his sketches while out, making his own light, creating his own world of space and silence.

The artist Charles Angrand, who also painted at the now famous island of La Grande Jatte, where Seurat's iconic painting *A Sunday Afternoon on the Island of La Grande Jatte* was conceived, recalled heading back to Paris with Georges after a day's work: ". . . we would leave the end of the island by the 'Artilleryman's' ferry, which for two *sous* took us across to the Boulevard de Courbevoie, recently created along the riverbank. Trees had just been planted there, and Seurat took pleasure in proving to me that the green treetops against the gray sky were haloed in pink."

Back in his studio, Seurat was no less intense. "He works . . . like a laborer," wrote an anonymous observer in 1890, "from 9 o'clock in the morning until 7 o'clock at night, in that modest, well-lit studio on the Boulevard de Clichy which is stripped of all bric-a-brac, where the studies brought back from a stay by the sea or in the fields radiate in their white frames."

The Seine at Courbevoie (1885) was among the works exhibited by Seurat in 1886 to a scandalized public.

A man of few words, the hardworking artist came to life only when art—especially his—was being debated.

Writers and critics, he once remarked to Angrand, "see poetry in what I have done. No, I apply my method and that is all there is to it." It was the sort of remark that had come to be expected of him, dry, acute and, seemingly, not only without emotion but directed against the possibility of entertaining it. Degas called him "the notary." The influential poet and critic Guillaume Apollinaire, creative apostle of the avant-garde, dubbed him "the microbiologist of painting." And Gauguin referred to his painstaking technique as "petit point." All of them underestimated the depth and creative force of the young painter.

Here is the Pointillist painter Paul Signac, Seurat's most accomplished disciple, describing Seurat at work in the field. Sketching in oils on thin wood panels each roughly the size of a large cigar box lid, Seurat would later expand the themes into major works in his studio: "Confronting his subject, before touching his little panel with paint, Seurat scrutinizes, compares, looks with half-shut eyes at the play of light and shadow, observes, contrasts, isolates reflections, plays for a long time with the cover of the box that serves as his palette. Then, fighting against matter as against nature, he slices from his little heap of colors arranged in the order of the spectrum the various colored elements that form the color destined best to convey the mystery he has glimpsed. Execution follows on observation, stroke by stroke the panel is covered . . ."

By the time he got to his Pointillist phase each dot had the weight and density of a marble, the color and luminescence of a candy ball. By the thousands, millions, with precise mathematical exactitude, they were placed in order, each one producing its effect on its neighbors right up to the borders. And then, into the very frame itself.

It's all in the eye of the beholder

A small dot, so to speak, was required to put it all together—the human eye, upon whose retina the color points would mix, as if in a laboratory beaker, to form the image Seurat had composed. Seurat was so certain about his art and so proprietary of it that he seems to have considered the spectator a screen upon which he projected his work, images so specifically contrived that they had to be perceived in a certain designed way. He was at least as hard on himself as he proposed to be on his audience.

What he left out was an element of humanity. ("I apply my method and that is all there is to it.") The people in his paintings are, for the most part, stiff and lifeless. Devoid of personality, they are arranged in designed and balanced areas like pasted-down, cut-out dolls. Automata, they inhabit space which, although brilliantly atmospheric, is still strangely airless. And, in

National Galleries of Scotland

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Seated Boy, Nude, a Conté crayon drawing (left) and the small oil-on-wood-panel painting (right) are two of the many studies done by Seurat for one of his six major works, *Bathing Place, Asnières* (1883).

every case, we are at least as aware of their creator as we are of them.

That is one point of view. Another is that Seurat was entirely Olympian in outlook and personality, that his work was purely classical, remote and, therefore, necessarily impersonal and spectatorial. He said himself that harmony was central to his art, and in this world people were merely shapes in its pursuit.

Once he had gotten under way, his ambition was formidable. The Impressionists had only just launched their revolutionary ideas with color that blinded the conventional vision of the times. Their first show was held in the spring of 1874 when Seurat, at 14, hadn't yet entered art school. By the time he was in his early 20s, while the Impressionists were still controversial in official France, Seurat had already decided he would go far beyond them; their discoveries would be just a point of departure. What he wanted, according to John Rewald, the eminent historian of modern French painting, was "something new, an art entirely my own."

The spontaneity of the Impressionists, who worked outdoors in full sunlight with pure colors—intent on recording the moment and their reactions to it as filtered through their temperaments—was something that Seurat actively sought to avoid. He was after a totally designed, ordered, planned, formal composition. And although, after seeing the work of the Impressionists, he lightened up his traditional Beaux-Arts palette, he differed widely in how he used the paints themselves.

SMITHSONIAN*'s former Art Editor, Bennett Schiff wrote last year in these pages on Joseph Wright of Derby (September) and on Titian (November).*

Signac put the difference between the Impressionists and the Neo-Impressionists (Seurat, Signac and a handful of others) succinctly. Although the Impressionists had obtained a luminous result by their use of pure color based on the spectrum, they muddied their paintings by overlapping the pigments. The Neo-Impressionists, said Signac, by eliminating all muddy mixtures, by the exclusive use of the optical mixture of pure colors, by a methodical divisionism and a strict observation of the scientific theory of colors, insured a maximum of luminosity, of color intensity, and of harmony—a result that had never yet been obtained.

Seurat's life fell into three parts, each of almost equal duration. We are speaking of a mere three decades: childhood and primary school; formal instruction in art, which came to an end with a year's service, at age 20, in the army; and then a final decade of mature accomplishment, which came so very early to that abrupt and tragic end.

It is odd that, for a man who lived for color, he was so entirely colorless himself. Formal and reserved in his manner, silent for the most part, he became articulately insistent if he felt he had to defend his theories—although he didn't want them to get around too much for fear of their being lifted by other painters. He dressed formally in dark gray and black, wore clean white linen and sported a full, carefully groomed beard.

His boyhood friend, classmate in primary art school and later at the Ecole des Beaux-Arts, Edmond-François Aman-Jean, recalled in 1923 that Seurat resembled Donatello's handsome Saint George. "His father and his whole family were all the opposite of what we were," wrote Aman-Jean, "thanks to our tastes and our passion for art. How on earth did this passion

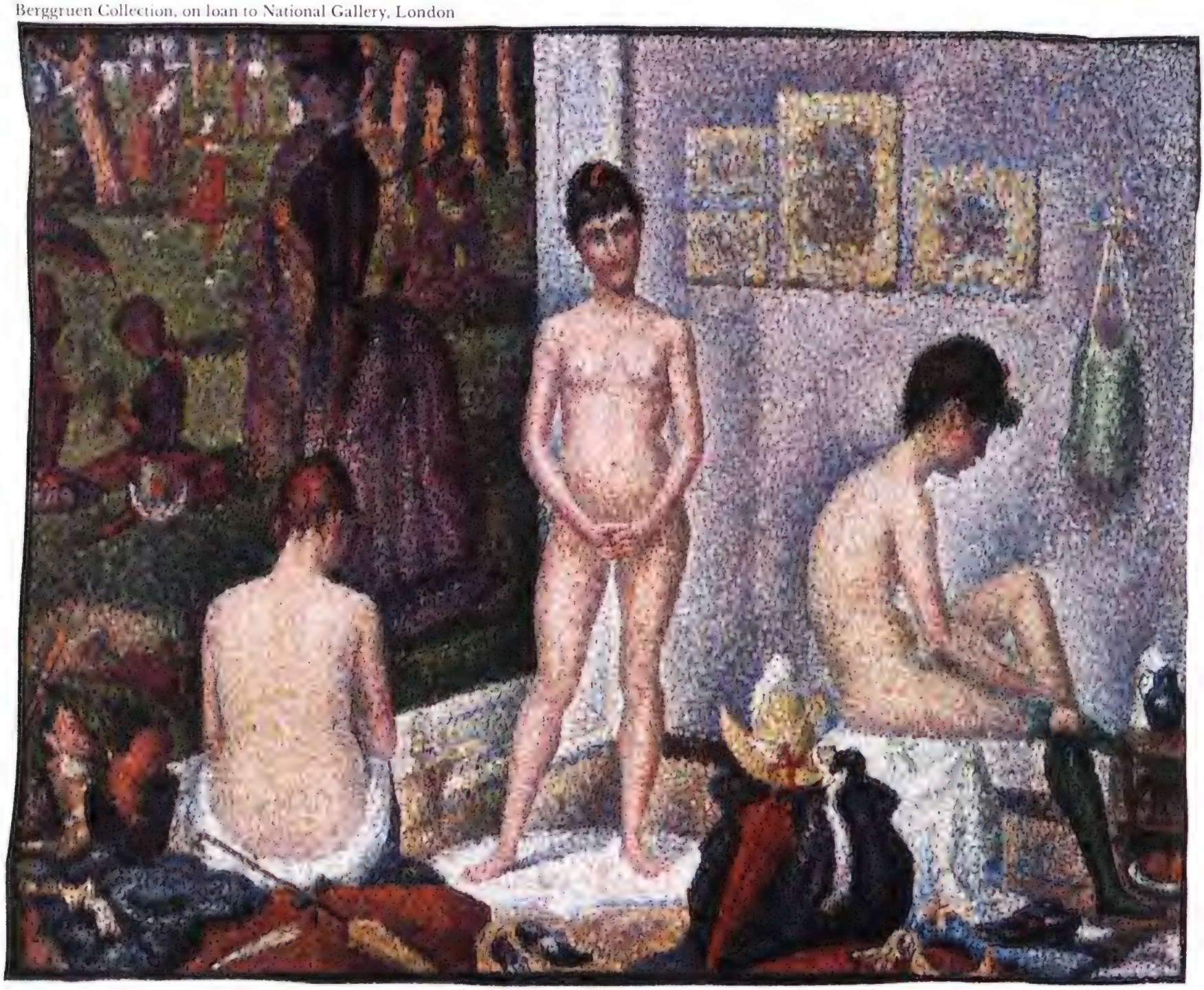
come to him and to me? It's the mystery of what can lie asleep underneath the most bourgeois covering."

Bourgeois he may have been, but young Georges' father was also something of an idiosyncratic oddball and a self-made man who supported his artist son comfortably all of his life. Seurat never lacked for money to pay the rent for a studio, to buy good clothing, paints, brushes and canvas. He reportedly had an allowance from his father of 400 francs a month, at a time when the average monthly wage for an industrial worker was 150 francs.

Chrysostome-Antoine Seurat, who died the same year as his son, had come to Paris as a young man. He had become a *huissier*, a legal official or bailiff, in the court system of La Villette, an independent borough just outside Paris, and later ventured into real estate, where he made out very well. He bought a suburban house in Le Raincy about six miles northeast of Paris and spent most of his time alone there, gardening and coming into Paris now and then to have dinner with his family.

Georges also joined the family regularly for dinner. On one such evening he brought his new friend Paul Signac, who described the scene for posterity. Chrysostome Seurat had lost an arm in a hunting accident and was fitted out with a mechanical limb which, at the table, Signac found to be a somewhat eccentric device: "At mealtimes he screwed knives and forks into the end of this arm, which enabled him to carve legs of mutton, fillets (of beef), poultry and game with speed, verve even. He positively juggled with these sharply pointed weapons, and when I was sitting next to him, I was terrified for my eyes. Georges paid no attention to these music-hall performances." In fact, Georges seems

Berggruen Collection, on loan to National Gallery, London



Models, 19 inches wide, is one twenty-fifth the size of Seurat's major work of the same name, owned by the Barnes Foundation. On the left wall hangs the artist's *A Sunday Afternoon on the Island of La Grande Jatte.*

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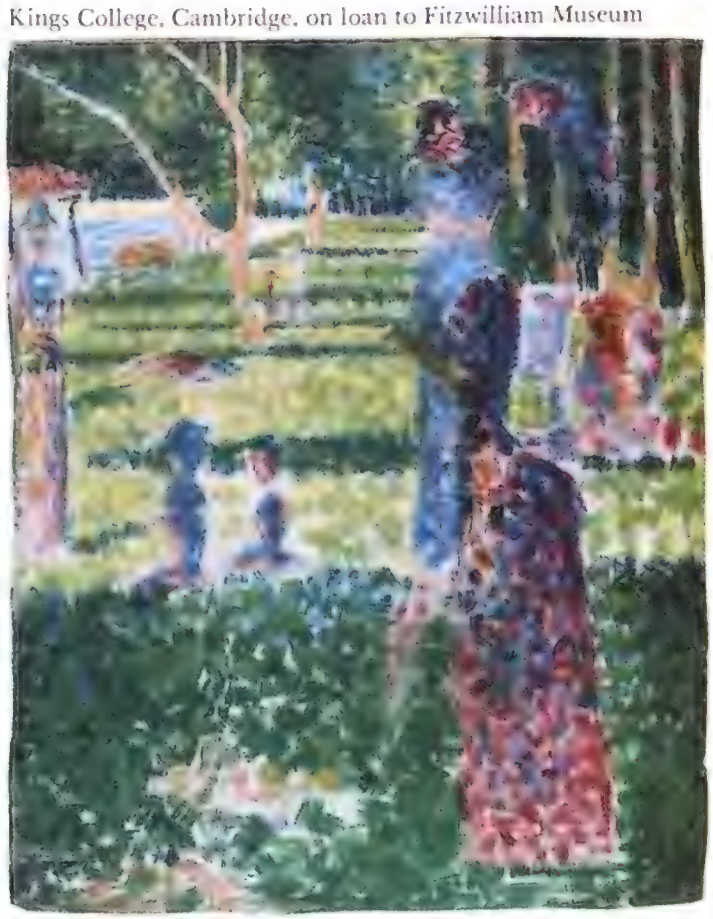


For *La Grande Jatte*, his masterpiece, Seurat made 57 studies—27 drawings, 27 panels and 3 canvases—four of which are above. From left, *Landscape, Island of La Grande Jatte*; *The Couple*; another version of *The*

never to have paid much attention to his father at all.

Georges was, however, close to his mother, a nurturing housewife, and visited her regularly throughout his life, always on time, always carefully dressed and attentive. There was an older brother, an unsuccessful playwright, and a sister. Georges was the third child; a younger brother had died at age 5. He seems to have been dismissive in later life of his father and brother, as he was of most people, except when it came to matters of art. There he could be very businesslike, asking for clarifications when it came to opinion, and ready to correct, in person and in the press, what he considered to be inaccuracies. (He subscribed to a press-clipping agency so he could monitor what was being written about his art.)

Only after his death did his closest colleagues learn that Seurat had had a mistress, and that she was the mother of his child. From all accounts, he seems to have been very close to Madeleine Knobloch, a working-class artist's model. He painted a portrait of her, entitled *Young Woman Powdering Herself*, and it is included in the exhibition along with a smaller oil-on-wood-panel study. Seurat named his son Pierre-Georges, the reverse of his own given names, and introduced his mistress and their son to his family two days before he died. Two weeks later, the diphtheria epidemic claimed their child, too.

Seurat's training as an artist was conventional, following the pattern for youngsters with obvious talent. He had begun to draw as a boy, and it was a natural progression for him to enter a municipal art school near his home in 1875. It was there that he met Aman-Jean. Three years later he passed the rigorous examinations for entrance to the Ecole des Beaux-Arts, the centerpiece of the French cultural establishment, the state's bastion of formal art training.

At the Beaux-Arts, Seurat was a good if not inspired student, placing from the lower third to about the middle of his class. He worked assiduously, learning the basics; visiting the Louvre, painstakingly making drawings after Raphael, Michelangelo, Bellini, Perugino, Titian; finding heroes, importantly among them Ingres, the great exponent of line, and Delacroix, the dramatic explorer of color. Outside of the classroom he was always drawing from life, ever the observer.

Seurat read extensively in literature, social commentary, and especially current scientific theories concerning the laws of optics, the chemistry of color and the principles of light. He went with Aman-Jean to the Fourth Impressionist Exhibition in 1879 and was greatly impressed by it. Gradually he seems to have become disenchanted with the formality of the Beaux-Arts and its view of contemporary art. He and Aman-Jean may have already taken a studio together, and Seurat seems simply to have stopped attending classes. In any event he never went back.

In November of that year Seurat, then 19, was called up for military service. Stationed at Brest on the northern coast of France, he became enchanted with the open sea, the coastline and the small fishing villages of Brittany and Normandy. Seurat was stationed there only a year, but that year, it turned out, benefited him as much as it did his country.

Seurat's return to Paris marked the beginning of his

Metropolitan Museum of Art

Metropolitan Museum of Art

Couple (in which he refined patterns of light and dark for that section of the final work); and an oil-on-canvas sketch, a little over 3 feet wide. *La Grande Jatte* itself is huge, measuring about 10 feet in width.

life as a fully mature artist. At age 20, his formal schooling was over. Until his death, Seurat would now grapple unremittingly with the issues of light, color and formal design that so fascinated him. His life now fell into an ordered pattern. He spent his days wandering the city, making sketches for the paintings he would create in his studio. He drew incessantly. He helped to organize the Groupe des Artistes Indépendants and its successor, the Société des Artistes Indépendants, both in opposition and in protest to the official annual Salon, upon which artists had traditionally depended for their exposure to critics and the public. He became known to the leading intellectuals—poets and critics and writers, editors and publishers. Although he attended their meetings and gatherings, it was understood that he was a solitary sort of fellow who spoke only when he had something to say about painting. He was a good listener.

In the five years before his death, Seurat returned during the summers to some point on the coast to sketch. Later, in his Paris studio, he painted some of the most compelling sea and harbor paintings of modern art, high-keyed, blond and static evocations of space and silence. Along with his drawings they are among his most formidable and least known works.

Quiet though he was, he attracted a following with the force of his painting and the individuality of his drawings. Signac, an insouciant and elegant figure, became a disciple of his; and Seurat even attracted the commanding person of Camille Pissarro who, for a time, became deeply involved in his use of color and paint application. A number of younger painters were ardent followers and, although there were few sales, Seurat was known and talked about and shown. There were followers in Belgium and in Italy.

Toward the end of his life Seurat immersed himself in the streetlife and nightlife of Paris. He had always been a wanderer of the riverside, of alleyways, an observer of derelicts, subjects for his crayon. Now he became interested in painting Paris and in being entertained at night, in dance halls, at the circus. These works are oddly posterlike. Seurat takes a lot of looking at. After a while, he casts a spell of stillness and mystery. The scenes become dreamlike and surreal. In *Circus Sideshow*, a medieval, dunce-hatted trombonist, a kind of sorcerer, a wizard set in a rosy light, is observed by a row of spectral onlookers who form a kind of footlight frieze. All of it is presented as if planned by a mathematician—for he was that, too.

This formality, this exactitude, is evident in everything he did, from his magical drawings to his full-scale paintings. Seeing his work in depth, in its full range of intense accomplishment, is revelatory. Last April, to observe the centenary of Seurat's death, France mounted a thorough exhibition of his work at the Grand Palais in Paris. Having neglected him for all of those years—there had never been a truly comprehensive survey of his work in his native country, although there was one at the Museum of Modern Art in New York in 1958—the country turned in a superbly representative and scholarly show. This exhibition, now at the Met through January 12, 1992, contains 36 paintings on canvas, 37 oil sketches on wood panels done in the field as studies for the large paintings, and

Overleaf: A Sunday Afternoon on the Island of La Grande Jatte can be seen at the Art Institute of Chicago.

Art Institute of Chicago

Trustees of the Tate Gallery

Summers, Seurat went to the Channel coast; "Let's go get drunk on the light once more," he wrote Signac. His marine paintings (here, *Le Bec du Hoc, Grandcamp*) are a revelation of Met show.

The artist's last major work before his early death at age 31 was the posterlike *Circus.* Signac, who bought it, made sure Seurat's painting would belong to France one day.

110 drawings. All together, it is a sumptuous feast for anyone interested in seeing much of Seurat's work in one place. To top this off there is an impeccably detailed catalog, the work of Seurat scholar Robert Herbert, with contributions by art historians at the Musée d'Orsay in Paris and at the Met.

Unfortunately, and unavoidably, four of Seurat's masterpieces are not in the show. His most famous work, *La Grande Jatte,* was hanging in the MOMA exhibition in 1958 when a fire occurred there. Not surprisingly, its owner, the Art Institute of Chicago, is not eager to let it leave again. The Barnes Foundation in Merion, Pennsylvania, which has *Models,* never lends anything. *Bathing Place, Asnières* cannot be let out of London's National Gallery because of its size and fragility; and the Rijksmuseum Kröller-Müller in Otterlo, the Netherlands, didn't want to lend *Chahut.* A valiant and successful effort has been made, however, to circumvent the gaps by showing Seurat's many and detailed studies of all of these works, many of them small panels, some of them complete paintings in themselves.

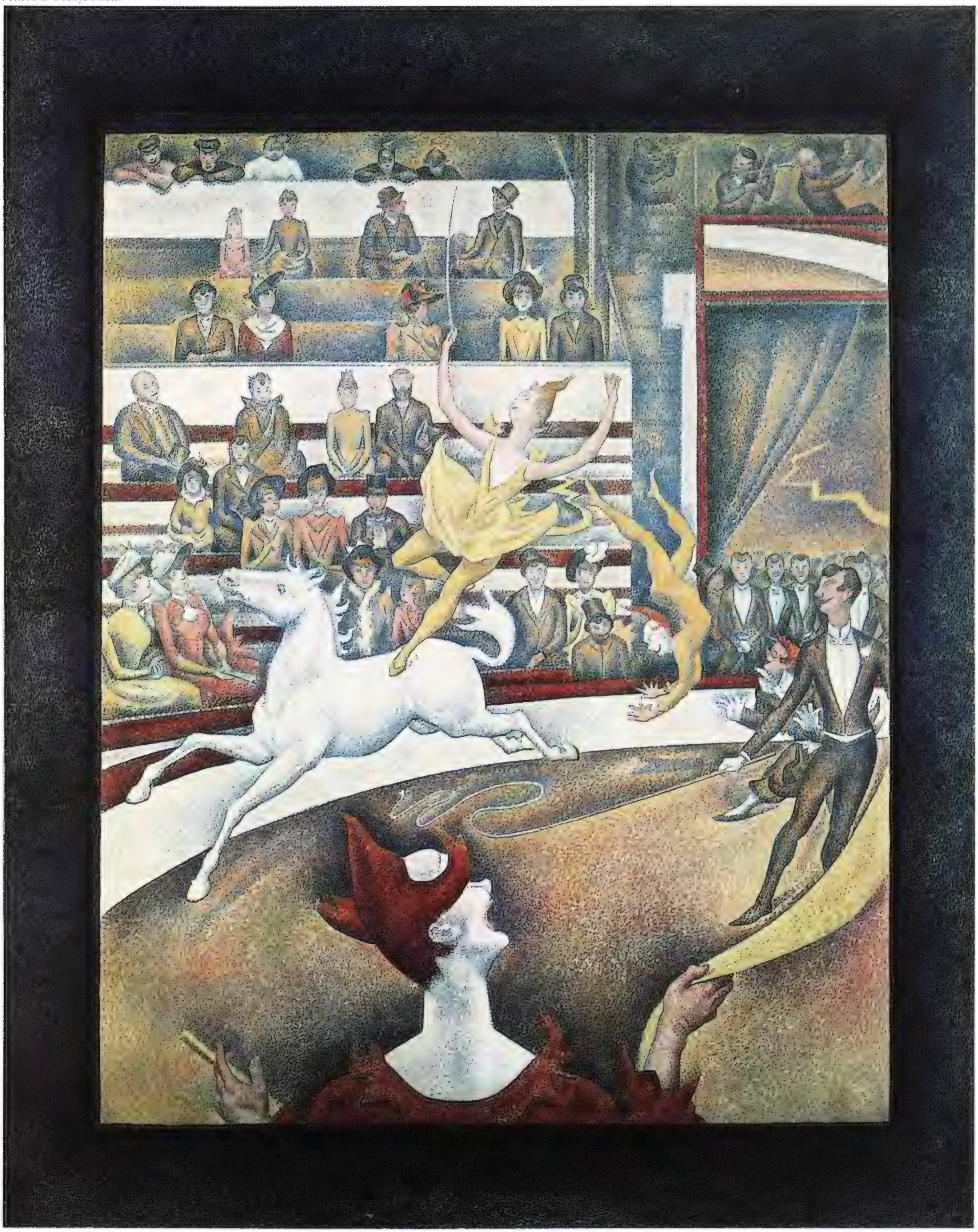
Looking at the drawings from Seurat's earliest student days, one can see that the authority and certainty that define an authentic artist of genius are already evident. As the sooty masterpieces emerge, soft as down in their greasy crayons on the textured paper Seurat chose, the effect is lasting. If, as a rule, the drawings that contain people are faceless, they are also faultless. The people, when they do appear, are inanimate, impersonal; they are shapes that aid in the balance of light and dark, of texture; and even though they are black and white, they are also limitless in their evocation of temper and mood.

This show is going to nail down a fact long known to scholars and students of late 19th-century French art, which is that Seurat's body of drawings is a major, integrated achievement, unique in technique, impeccable in control. There is no more formidable body of drawings in all of modern art. The gradations are so fine, the touch so subtle, the areas of light breathlike in their delicacy, and the dark endless in its transposition to deepest black.

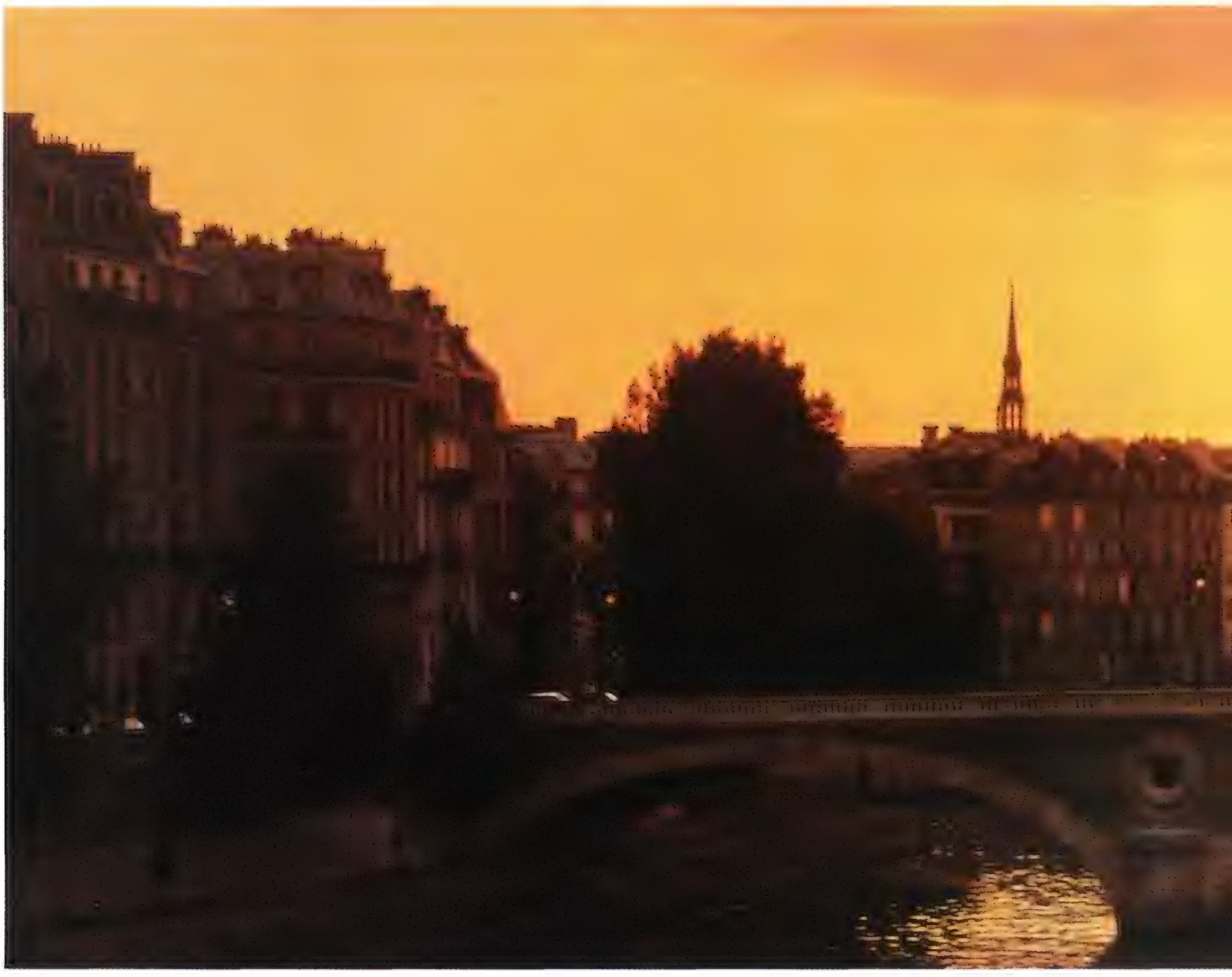
Seurat once wrote to the influential writer and critic Félix Fénéon, who had been his chief exponent and advocate at the beginning of his career, that "the day everyone practices this technique, it will no longer have any value and another will be looked for, which is already the case. I have every right to think this and say it, because I painted in this way only to find something new, a painting of my own."

Today, no one paints like Georges Seurat, and the work of finding the most illuminating way of presenting color goes on.

Musée d'Orsay, Paris

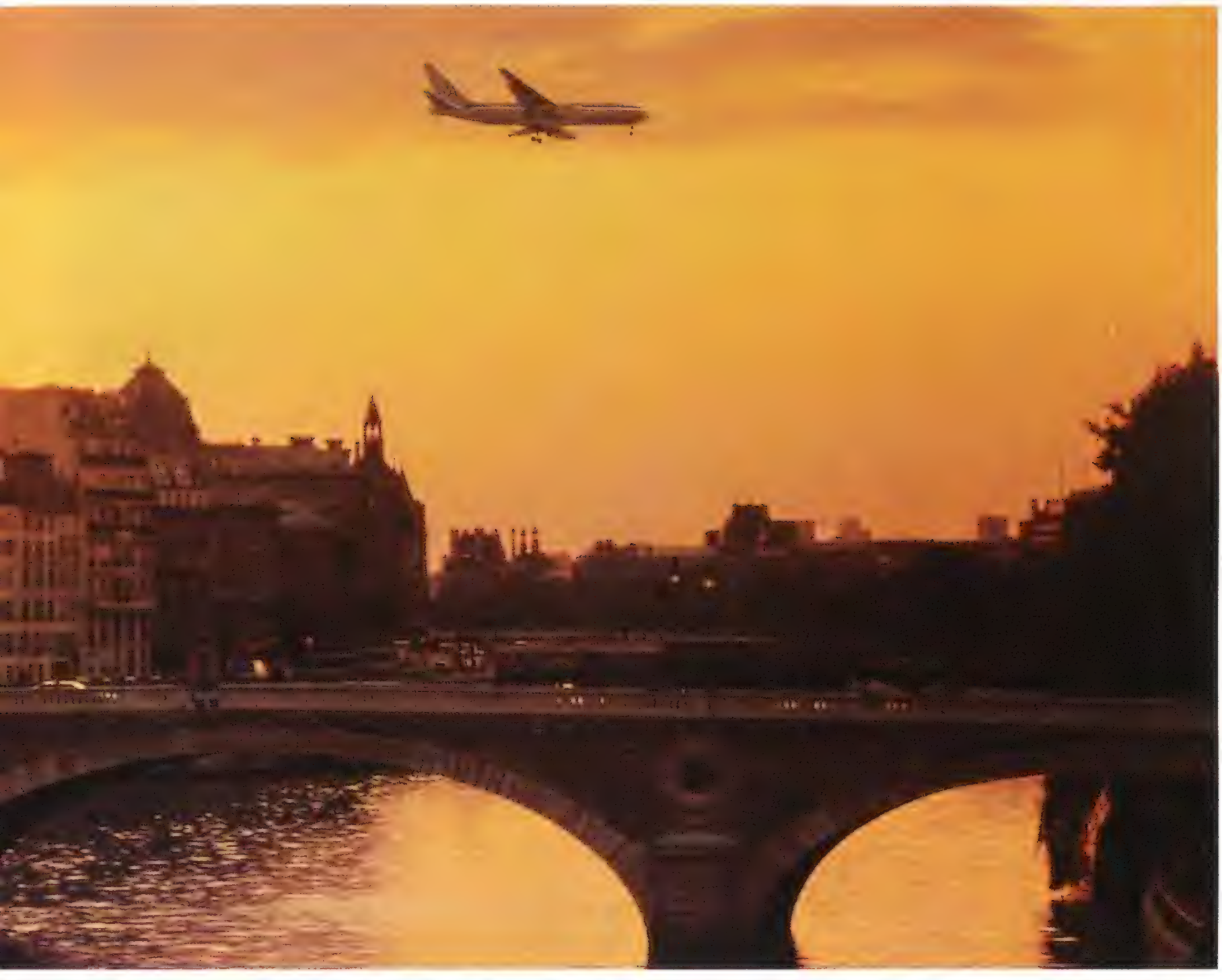


ALL ACROSS EUROPE,
AS THE NEW DAY ARRIVES,
SO DO WE.



Schedules subject to change

FRANCE ITALY SWEDEN SPAIN BELGIUM



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Fifty thousand watts' worth of strobes were needed for 2 A.M. shot of this valley oak. The trees were once widespread from Los Angeles to Mendocino. Few remain; this one will be replaced by a shopping center.

Photographs by Susan Middleton and David Liittschwager

A picture plea to save California's endangered species

In a state where development is rampant, two photographers cast a sharp eye on some special treasures that need protection

When it comes to endangered species, the creatures that usually get the ink are the glamorous superstars—the rhinos, the pandas, the condors—but when our human activities encroach on the natural world, we play no favorites. We crush the gecko along with the grizzly, the toad along with the timber wolf, the wildflower along with the redwood. Photographers Susan Middleton and David Liittschwager bore this inequity in mind when they set out to record on film some of the imperiled plants and animals of California. Sponsored by the California Nature Conservancy and the California Academy of Sciences, they traveled 7,000 miles up and down the state in search of such creatures as the Shasta crayfish, the desert tortoise, the barefoot banded gecko, the Little Kern golden trout and the light-footed clapper rail. "We never rejected anything for lack of charisma," says Middleton. "Any living thing is astonishing in its own right—the challenge is to find its special beauty."

Ancient sage of the Mojave, the desert tortoise has changed little in 20 million years. In our fast-paced world of off-road vehicles, and energy and mineral projects, its hope for a future lies mostly in refuges.

The pictures shown here, selected from their new album *Here Today: Portraits of Our Vanishing Species,* published this month by Chronicle Books, demonstrate how well they have met that challenge. The subjects are usually posed against stark black or white backgrounds—"rendered naked" to emphasize the loss of habitat they need to survive—and illuminated to reveal every scale, feather or hair. Writes naturalist and author Wendell Berry in his foreword, they are pictures that say: "Look! Look! See how fearfully and wonderfully this creature is made."

Making the photographs was fraught with difficulties, logistical and otherwise. In order to create instant studios wherever they found their subjects, the photographers traveled in a van loaded down not only with cameras but also with lumber, foam paneling, sheets of Plexiglas, huge rolls of seamless paper, black velvet, gaffer's tape ("Our world was held together with gaffer's tape," says Liittschwager), staple guns, power packs, a portable generator, two bags of tools and "advanced Tinkertoys"—an armory of stands, boom arms and clamps for setting up lights. Since most of the animals and plants are threatened because of human intrusion into their habitats, the photographers often found themselves working not in pristine wilderness but under freeway interchanges and power lines. They photographed one rare plant, the Santa Ana River woollystar, in a trash-strewn, smogbound gravel pit with a military airstrip on one side and a rifle range on the other. Between the noise and the 110-degree heat, Middleton remembers, "It was like hell, or something close to it—but this plant had managed to survive."

A number of the animals were in the possession of researchers who were studying them, while others were photographed at zoos and living museums. But some had to be captured in the wild, in cooperation with the California Department of Fish and Game. A biologist donned a wet suit and dived into a lake near Mount

Because gene pool of remaining pairs is so small, the light-footed clapper rail could die out in spite of efforts to restore some of the polluted Southern California marshes that once were the bird's habitat.

Shasta to find the Shasta crayfish; the Little Kern golden trout were packed down from the mountains by llama train to a makeshift studio on the front porch of a tourist lodge.

In all cases a wildlife expert was present and the photographers took pains to safeguard the welfare of their models. Creatures taken from the wild were released in the exact places where they had been captured. When photographing wildflowers, Middleton and Liittschwager even built platforms so that their equipment would not damage nearby plants.

Nowadays the photographers are going nationwide with a new project to document 100 of the country's endangered species. Their pictures, writes Berry, are a plea, a way of saying that "neither you nor a multitude of you could make such a creature. If you could make even a replica, you could not make it live."

Don Moser

Kinetic as it is colorful, the San Francisco garter snake required a full day of shooting—and 25 rolls of film.

Aglow in late afternoon sunlight are tiny blooms of Baker's meadowfoam, now on only a few private lands.

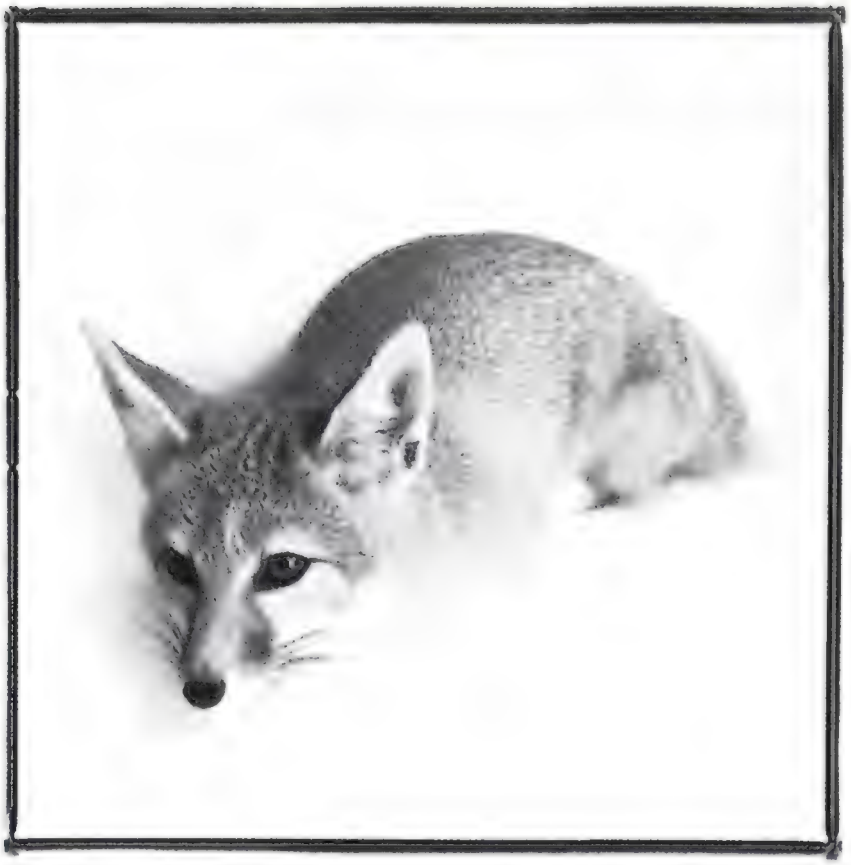
Contamination of once crystal-clear pools due to cattle grazing and logging threatens the Shasta crayfish.

Little Kern golden trout was nearly hybridized into extinction when non-native rainbows were introduced.

All but one of the habitat areas for the San Francisco forktail damselfly are now jeopardized by urban sprawl. Males are bright blue, while the female insects are a brassy, brownish green. At present there are no efforts to protect the species.

With its double-sealed eyelids, ear flaps and sand-trapping nasal channels, the Coachella Valley fringe-toed lizard is well designed for swimming into sand dunes. The local "lizard surcharge" on land development is now funding a refuge habitat.

Smallest North American member of the dog family, each San Joaquin kit fox nevertheless needs a square mile of territory. Despite California's land set-asides, the species may be gone by the end of the century.



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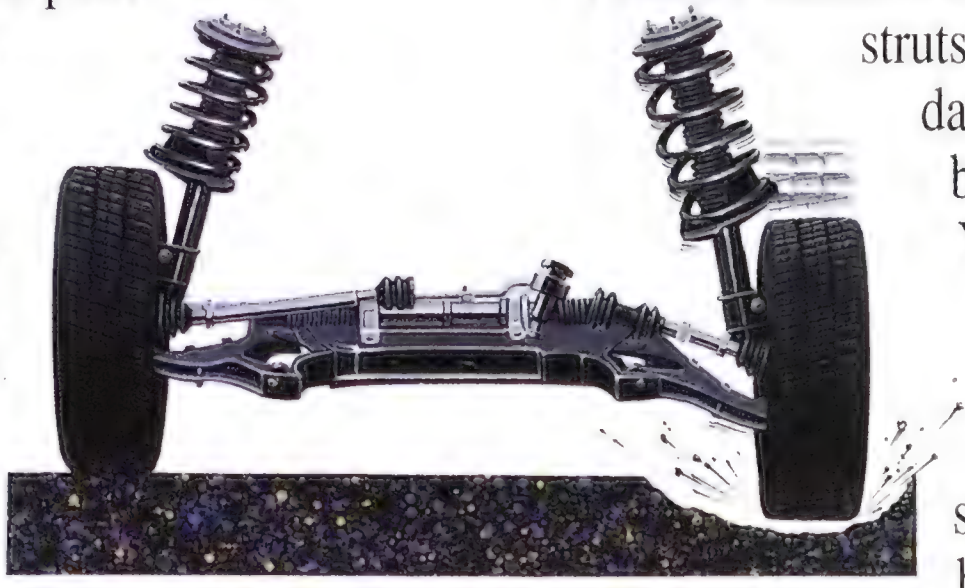

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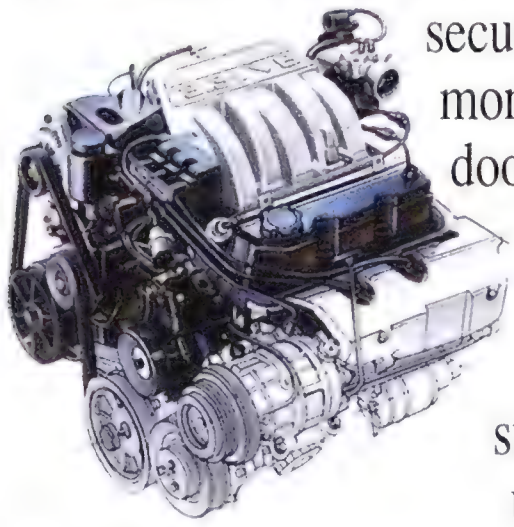

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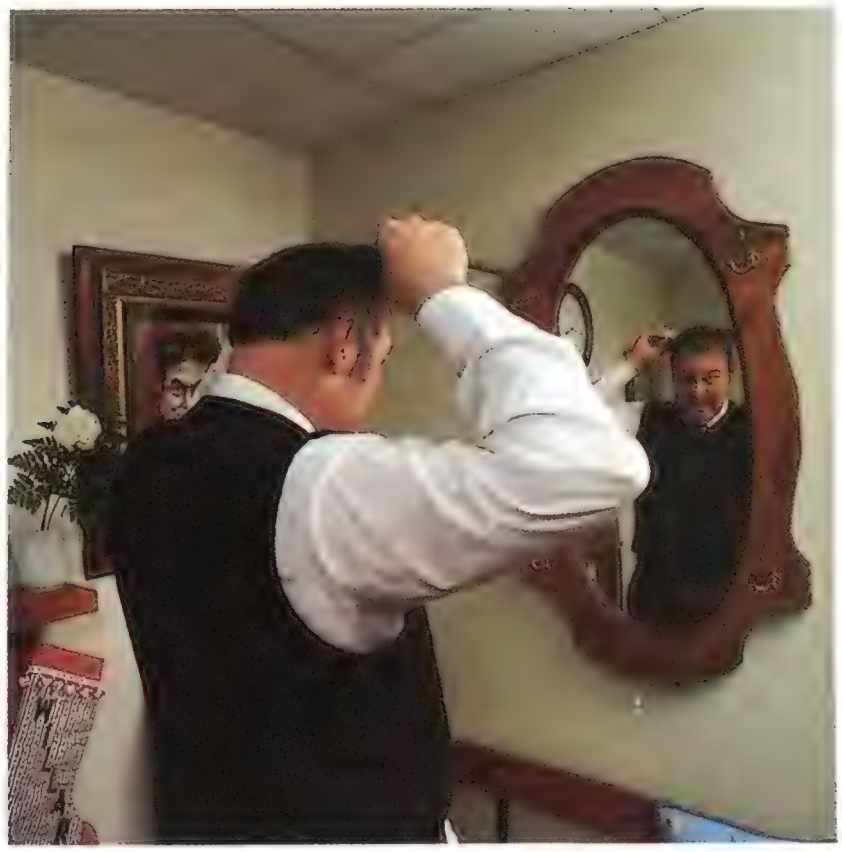
The lady wearing the Battle of Bunker Hill may have been a Colonial sympathizer, for the redcoats shooting it out with militiamen seem oblivious of artillery moving up from the south to surprise them.

By Jon Krakauer

Carpeting your noggin is very much in vogue

And oh, the lengths they went to in times past to be au courant, and thus politically correct, creating a bonanza for generations of wigmakers



Weatherman Willard Scott, who sports his rug on the *Today* show, says, "I put it on and I look fantastic."

It's Monday morning on the set of NBC's *Today* show. A few minutes after 7, Bryant Gumbel announces, "And now here's Willard with the weather!" The smiling, well-fed form of Willard Scott fills the television screen. On this particular morning, as is often the case, the bald pate of the most famous weatherman in America is crowned with a toupee made from 30,000 genuine human hairs, each of them painstakingly hand-knotted to the wig's foundation at a cost of nearly $2,000. Willard's rug is astonishingly lifelike, but that does not prevent the guest Bryant has been interviewing from making a wisecrack about "the big round guy with the fake hair." Peals of laughter erupt across the set.

The life of the bewigged is fraught with snickers and cruel quips. Artificial hair strikes most Americans as being intrinsically funny, the stuff of slapstick, a surefire laugh-getter in the tradition of whoopee cushions and exploding cigars. This doesn't bother Willard Scott. The *Today* weatherman finds a corny wig joke as hilarious as the next person, even when—especially when—he is the butt of it. "I think it's just great when people get a kick out of my piece," Willard declares. "That's why I wear it, for Pete's sake."

Others, though, have a harder time shrugging off wiggy japes and suffer the stigma of phony hair acutely. There is, for instance, the unfortunate tale of Harold B. McSween. In 1959, McSween ran for Congress in Louisiana against that state's recently deposed governor, the flamboyant Earl Long. Long had just been released from a mental institution, to which he had been committed after being drummed out of the governor's mansion for a long list of unsavory deeds. McSween was expected to beat the scandal-tainted ex-governor hands down.

Long, however, was a cunning old pol and a virtuoso at playing to down-home Southern crowds. He campaigned hard in small Louisiana towns, where he handed out free hams and railed that McSween was nothing but an uppity city slicker in a "little old tuppy." McSween's locks were entirely his own, but the slander stuck. McSween, according to journalist John Berendt, "was forced to crisscross the state, yanking his own hair to prove it was real." Long won by 4,000 votes.

Artificial hair has not always been a magnet for scorn and ridicule. People have been donning wigs since the beginning of recorded history, and for most of those 5,000-odd years wig wearers were held in high esteem. False hair was popular among Assyrians and Sumerians, Cretans and Carthaginians, Persians and Greeks. Wigs were de rigueur in ancient Egypt among both women and men of royalty and the upper classes. Which may be why moguls, nabobs and magnates of all kinds are snidely referred to as "bigwigs."

A number of well-preserved hairpieces have turned up in the tombs of mummies unearthed by modern archaeologists. Not meant to pass for natural hair, Egyptian wigs were typically ornate, helmetlike constructions made from plant fiber such as linen, from human hair cuttings stiffened with beeswax, or even from precious metals. Although black was the most

common color, wigs dyed blue, red or green came into vogue in the 12th century B.C. The Egyptian kings were fond of false beards, as well. The longest beards were reserved for kings—and apparently queens, too, if statues of Queen Hatshepsut sporting a fake beard are any indication.

The reign of the pharaohs eventually came to an end, Egyptian civilization collapsed. But the wig lived on. Hannibal regularly donned a toupee before going into battle. Prostitutes in ancient Rome wore garish yellow wigs to advertise their services. At the other end of the empire's social spectrum, no self-respecting lady would be caught dead without a hairpiece (Ovid tells us that blonde tresses imported from the Gauls were all the rage), and the wife of Marcus Aurelius reportedly owned several hundred. Some Roman busts were actually fitted with removable wigs, sculpted from marble, that could be changed periodically to insure that the statues remained au courant. Indeed, Romans were so enamored of wigs that Martial, the epigrammatist remembered for his mordant observations on Roman life, was moved on more than one occasion to lampoon his countrymen's vanity in verse: "The golden hair that Galla wears/Is hers—who would have thought it?/She swears 'tis hers, and true she swears,/For I know where she bought it."

Although the history of the wig is long and distinguished, it is not without setbacks. The rise of Christianity brought a chorus of disapproval from church spokesmen, who believed that wearing any kind of hairpiece was a mortal sin. Reflecting the view of his fellow churchmen, the ecclesiastical writer Tertullian proclaimed in the third century A.D. that wigs were "inventions of the devil" and warned that "the fake hair you wear may have come not only from a criminal but from a very dirty head, perhaps from the head of one already damned." The wig went into serious decline, where it remained for most of the Middle Ages.

During the 17th century the wig staged an astounding comeback. The seeds were sown in France in 1620 when the Abbé de la Rivière appeared at the court of King Louis XIII in an elegant blond hairpiece. The 19-year-old king—whose hairline was soon to be on its way south—duly took note. In 1624 His Majesty started wearing a carpet of his own. The king's fawning courtiers wasted no time in aping their leader; soon at Versailles everybody who was anybody was lavishly bewigged, and the so-called golden age of the periwig was at hand: 150 years of wiggy excess.

The 17th-century periwig or peruke (both terms are derived from the French *perruque*) escalated in length, bulk and height with each passing decade. During the reign of Louis XIV, all Frenchmen (and women) of rank lived under mountains of phony locks, which were tinted white with copious amounts of perfumed powder. "Louis XIV considered the wig so vital to his royal dignity," writes Wendy Cooper in her excellent book *Hair*, "that he never allowed himself to be seen without it by anyone except Binette, his personal barber. It was passed to him through the curtains of his four-poster bed. There is no record of whether he kept it on in bed for the benefit of his many mistresses, or whether the royal nightcap was considered sufficient camouflage."

Periwig madness crossed the Channel from France to England in 1660 when Charles II, who had fallen victim to the fad during his exile at Versailles, was restored to the English throne. Forthwith, the new king infected his subjects with a strain of wig fever even more virulent than that afflicting the French. By the arrival of the 18th century the wig had reached dizzying altitudes, sometimes towering two feet or more above the scalp before cascading down the back and breast in a plethora of corkscrew curls that nearly reached the waist.

Carvings in the tomb of Amenhotep III's vizier show tightly braided Egyptian wigs; hers is the longer.

A masterpiece, Louis XIV of France's extravagantly curled peruke was made by one of his 40 wigmakers.

Jon Krakauer, who has no need of a rug, freelances from "the very wiggy town of Seattle." He last wrote for SMITHSONIAN *on trees, in the April 1990 issue.*

Women were in the habit of embellishing the summits of these immense hairpieces with all manner of curious tableaus. Wendy Cooper tells of a wig "on top of which were modeled ducks swimming in a stormy sea, scenes of hunting and shooting, a mill with a miller's wife flirting with a priest, and a miller leading an ass by its halter. Skilled coiffeurs were needed to erect the more and more outrageous styles, and once up, they were not disturbed for many weeks. As the interior was filled with wool, tow, and hemp, plastered together with a 'pomatum' based on beef marrow, the smell gradually became anything but alluring."

Although bargain-basement wigs made from horsehair, goat hair or duck feathers could be purchased for £2 or less, the finest full-bottomed wigs of the day—artfully manufactured from real human hair—cost as much as £200. According to Diderot's *Encyclopedia*, the leading reference work of the age, hair cut from the heads of people who drink ample quantities of beer and cider makes the highest quality wigs, while the hair "of men who live in sexual debauchery, or of women who give themselves to the uses of men, has less sap, dries out, and loses its quality."

Not surprisingly, expensive wigs were prime targets for thieves, who would brazenly reach into carriages and pluck them from the heads of wealthy passers-by, or get monkeys or urchins to do their dirty work for them. Such indignities were no doubt as injurious to the victims' pride as to their pocketbooks. Two centuries later, in 1985, when a thief snatched Andy Warhol's trademark silver wig from his scalp during a public appearance, Warhol would lament that it was "the day my biggest nightmare came true."

The English fascination with ersatz hair was not limited to coverings for the head. During the licentious 17th and 18th centuries, it seems that small wigs called merkins were popular adornments for the female mons veneris. In this same vein, legend has it that Charles II turned the merkin on its head, so to speak, by commissioning a periwig made entirely of curls clipped from the nether regions of his numerous mistresses.

Across the Atlantic, American Colonists were no more immune to wig madness than were their European contemporaries. Initially most wigs worn in the New World were imported from England, although by the start of the Revolution numerous wigmakers were plying their trade in the Colonies. But the American War of Independence—and the subsequent French Revolution even more so—brought the wig's giddy heyday to an abrupt end. As the heads of bigwigs began to roll from the guillotines, extravagance, ostentation and anything that smacked of class distinction or the deprecations of royalty fell quickly out of fashion.

Actually, wig fever had been showing signs of subsiding even before the Battle of Lexington and the storming of the Bastille. Revolution merely hastened the cure. By the late 18th century, with false locks gracing the heads of almost everybody who could afford them, the wig had simply become too popular for its own good. Bored trendsetters looking for something new and different came up with the novel idea of wearing their own hair in simple, natural coifs. Horrified, the Master Peruke Makers of London staged a protest march—to no avail.

Something the chrome-domed can crow about

The revolutions in France and the Colonies dealt bogus hair a blow but did not eradicate the wig altogether, in no small part because they did not eradicate the curse of baldness. At 20 years of age, when at its wooliest, the average human head is equipped with 100,000 strands of hair. By age 60, however, half of all men are bald, and some 40 percent of women suffer a substantial loss of plumage. Samuel Johnson, the eminent 18th-century lexicographer, theorized that baldness stems from "dryness of the brain." Modern experts suggest that the problem is in fact genetic in origin and can be inherited from either parent—not just from the

Zounds! A portly Briton recoils upon encountering his son Tom, wigged fit to kill—and proud of it.

Hairdresser to "feathered lady" must mount hassock to complete coiffure; a servant stands by with addenda.

mother's side of the family, as is generally believed.

Male-pattern alopecia, the most common kind of hair loss, begins when certain genes, usually triggered by age, command the victim's hair follicles to excrete an excess of the enzyme 5-alpha reductase. This enzyme changes the hormone testosterone into a chemical, dihydrotestosterone. With each successive generation of growth the hairs become smaller and finer, until the final result is the characteristic pattern of baldness seen on so many male heads. (The role of testosterone, the essence of all things manly, explains why hairlessness is less common in women, and gives chrome-domed men some justification for flaunting their baldness as a badge of virility.)

Men have sought a remedy for baldness for a long, long time. In ancient Egypt, bald Egyptians massaged their noodles with ground-up spines of hedgehogs mixed with aromatic unguents. If a recent supermarket tabloid is to be believed, Prince Charles rubs his royal bald spot with an ointment made from camel dung and bear grease. An equally esteemed publication advertised a decidedly more high-tech treatment that advocated inserting hairless heads into a powerful vacuum device designed to suck reluctant hairs out of subcutaneous hiding. None of these harebrained "cures," alas, has been shown to grow hair.

The only therapy that actually restores hair to bald heads is the drug minoxidil, marketed by the Upjohn Company since 1986 as Rogaine. Unfortunately, the treatment costs about $60 per month and seems to help only about 30 percent of those who try it. A newer and promising treatment that involves zapping the scalp with pulsed electrical stimulation was conducted at the University of British Columbia. It has not yet advanced beyond the experimental stages. The only baldness remedy proved to work for everybody, all the time, is still the good old wig.

Baldness, of course, is not the only reason people wear false hair. Since the time of ancient Greece, wigs have been an important part of theater, and are no less important today. Currently, the world's foremost theatrical wigmaker plies his trade from a 12th-floor loft in downtown Manhattan. He's a soft-spoken, meticulously groomed 60-year-old English expatriate named Paul

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Huntley (p. 135). It was he whom Willard Scott approached when NBC suggested that the weatherman don a carpet to cut the glare from his hairless coconut.

Indeed, many a famous actor and entertainer has sat for a fitting in Huntley's no-nonsense studio; floor-to-ceiling shelves hold a small army of wooden heads—wig blocks—sculpted to match the cranial contours of Debra Winger, Bette Davis, Michael Douglas, Michelle Pfeiffer, Sean Connery, Carol Channing, Rex Harrison, Christopher Reeve, Julie Christie, Lena Horne, Donald Sutherland and Melanie Griffith, to name but a few of the stars who have appeared on stage or screen wearing one or more of Huntley's creations.

Huntley's wigs have allowed actors to look virtuous or wicked, rich or poor, young or old—or both young and old in the space of a single film or play. To achieve the desired illusion, a director will often ask Huntley to create numerous wigs for each actor. "A few years ago I did a movie starring Jessica Lange, *Everybody's All-American*, in which Jessica's character had to age more than 50 years. I believe she went through 14 wigs in the film, some of which only made it onto the screen for a minute or two in the final cut." For Huntley, though, 14 wigs is nothing: when the Broadway blockbuster *Cats* was produced, he and his craftsmen were asked to make more than 300 feline toupees. And as a young apprentice wigmaker, Huntley helped create the wigs for Elizabeth Taylor and her costars in *Cleopatra*, a production that required literally thousands of hairpieces.

Although the wigs in *Cats* were made from yak hair (for beastly verisimilitude), the majority of Huntley's creations are made from honest-to-God human locks, which he purchases from an English hair merchant in standard 20- or 22-inch lengths, bound together in small bundles like bunches of asparagus. After being blended to achieve the desired color, the hair is ready to be tied to the foundation—a skullcap sewn from fine nylon lace that has been carefully preshaped on a wig block to fit the head of the intended wearer.

Too much hair makes a wig look "wiggy"

Attaching the hair to the flesh-colored foundation is a delicate, difficult, time-consuming process that has changed scarcely at all over hundreds of years. Using a tiny steel tool resembling a miniature crotchet hook, Huntley knots each hair to the nylon skullcap with a deft flick of his hand; between 50,000 and 300,000 hairs are thus attached to the typical full-head wig. "Generally speaking," Huntley cautions, "the greatest mistake you can make is to put too much hair in a wig. If you go overboard the wig won't have a natural shape, and it will look extremely 'wiggy.'"

By the time Huntley puts the finishing touches on one of his hairpieces, it doesn't look in the least wiggy. Examining Willard Scott's famous widow's peak from even a few inches away, it is impossible to tell that it's glued in place, rather than growing naturally from his scalp. "Absolutely amazing, isn't it?" Willard offers with a hearty laugh. "It's pretty different from some of the first pieces I had. I remember one I bought from a guy in Philadelphia that looked like somebody's pet gerbil had died on my head. We got half-plowed at a party that night and decided to put it on the basset hound. I'm telling you, he looked great in it!"

Huntley's wigs look nothing like gerbils, but they cost upwards of $2,000, and he is among the last of a disappearing breed. "The craft is dying in both this country and in Europe," Huntley laments. "It's sad, but it's hard to find people willing to do this kind of work anymore. You have to sit and concentrate with closely focused eyes, threading hairs in one tiny area for endless hours. It's like any craft: to do it well you must love it dearly."

Paradoxically, if the fine art of classical wig making is on the wane, business for companies that mass-produce inexpensive wigs has seldom been better. The latest renaissance of the wig began in the 1950s with the advent of television. Thanks to close-up camera angles and the corresponding premium placed on

English matron with cool, cropped locks (wigs were hot) awaits periwig her maid is preparing to install.

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In 1958 *Life* showed its readers partial carpets, how to wear them. Empire curls, side pieces and pouf (top, left to right) are modeled below. Cheaper than wigs, they were easy to wear and also added fullness.

youthful good looks, fake hair was back in vogue. At the time, most wigs sold in this country were imported from Hong Kong. They were cheap, and they looked it.

Enter Rose Marie Reid, a savvy businesswoman who had made a fortune marketing the world's first swimsuit with a built-in brassiere. Reid decided that if she could come up with a better wig, the world would beat a path to her door. Toward that end, in 1962 she hired a chemical engineer named Daniel Frishman, whose résumé included a stint as a technical specialist for the Oak Ridge atomic bomb project. Frishman's orders: find a way to mass-produce high-quality wigs that could be priced under $100. Frishman came through with flying colors; within six months Reid was selling the first of many, many wigs.

And not only wigs. Hairpiece manufacturers experienced a run on falls, cascades, ponytails. By the late '60s, one out of every four American women owned a hair "supplement" of one kind or another; in urban areas it was four out of every five. Hairpieces were sold at parties, like Tupperware, and sales mushroomed to $700 million annually. Supply couldn't keep up with demand.

The American wig boom cooled off considerably in the '70s, but Reid's company weathered the slump. Now National Hair Technologies, Inc., operating out of Lawrence, Massachusetts, it is the only large-scale wig manufacturer still in business on our shores. National Hair continues to make wigs by the methods Frishman pioneered, which differ from classical methods in many respects, the most significant of which is the hair itself. It is synthetic.

Frishman, who is bald as a cue ball but does not avail himself of his own creations, explains that the

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Reminiscent of Rapunzel, who let down her golden hair for prince to ascend, is modacrylic, destined for wigs.

"hair" is actually a modified acrylic fiber: "We had to find something that was durable, nonflammable, nontoxic, took a curl when set with heat, and looked, felt and moved exactly like human hair. Modacrylic satisfies all those requirements."

The fourth floor of National Hair's modest factory is filled with barrels of modacrylic fiber blended to match every color found naturally on human heads, along with a few, like fluorescent orange, that are not. These fibers are cut, combed and fed into knitting machines; what emerges from the business end is a bolt of stretchy material that looks like ordinary jersey fabric on one side, but sprouts a ten-inch growth of uncannily realistic hair on the other. The fabric is then processed, cut into two-piece patterns and sewn together. A little trimming, a little primping, and voila! a wig is born.

The latest bout of creativity in hairpieces has come from African-Americans, as they embrace styles looking to their ancestry. In braided cornrows that swirl around or march across the scalp; in plaits to the shoulder or beyond; in natural or artificial hanks of hair interwoven, sewn or glued into the wearer's own—the effect is exotic. So exotic that it is being copied far and wide, with nary a nod to ethnicity.

Not long ago, an unforeseen advantage of Frishman's innovative wig-making process came to light: because the ersatz hair comes out of the knitting machines in wide bolts, it can be used to make "wigs" of unprecedented size. The 20-foot King Kong that menaces tourists at Universal Studios in Los Angeles wears a $50,000 pelt made by National Hair. Other nonhuman clients include a robotic giant sloth built by the Dinamation International Corporation, a life-size woolly mammoth for the British Museum of Natural History, and the road-show versions of the Muppets' Barclay the Dog and Miss Piggy.

The modacrylic fur that covers all of these creations is virtually impossible to distinguish from the real McCoy. Likewise for National Hair's human wigs. "Our wigs look real in almost any situation," says Alan Thoday, the company's vice president. "They can even be worn in the water, although we can't really recommend swimming in a wig. We have a client in San Diego who wore his piece surfing, and eventually lost it when he wiped out on a big wave. Unfortunately, until that time his girlfriend had never suspected his hair wasn't his own. When the poor fellow emerged from the water, she took one look at him and went running up the beach, screaming. I don't think he's heard from her since."

Paul Huntley readies Marie Antoinette wig for Museum of the Moving Image; behind him, actors' wig blocks.

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By Meredith Sayles Hughes

Potayto, potahto—either way you say it, they a'peel

Native to South America, the vegetative gold traveled the globe as a valuable staple, fueling armies, improving diets, changing economies

Harvesting potatoes as her ancestors have done for centuries, a Peruvian Indian woman adds to her larder.

Rich in vitamins and minerals, a steaming potato can be a meal in itself—but watch out for the peel.

It is perhaps fitting that during the infancy of television, one of the first toys to be advertised on that medium of talking heads was a set of plastic accessories with which a youngster could fashion a kind of pseudo-human out of—a potato. That Mr. Potato Head has been a hit among children for nearly 40 years now should not be surprising. With its eyes, its varied hues, its vaguely humanoid shape, the potato tends to mirror us in ways that, say, the carrot—worthy vegetable though it may be—assuredly does not.

The potato not only looks a little bit like us, it has also, to an astonishing degree, influenced the history of the Americas and Europe and parts of Asia as well. In the view of some historians, the potato was the engine behind the Industrial Revolution; it propelled improvements in human nutrition and health; it determined the waxing and waning of populations, the patterns of migration; it even influenced wars. Invented, so to speak, in South America, it emigrated to Europe, then came back across the Atlantic to the United States, changing the diets and economies and lives of entire nations in the course of its travels.

This month the potato is recognized in a major exhibition opening at the National Museum of Natural History, "Seeds of Change." The exhibition treats five elements—the potato, maize, sugar, the horse and disease—that radically changed civilization as exchanges of plants, animals and people began following Columbus' first voyage from Spain to the Americas. My husband and I, as longtime students and fans of the potato and as founders of the Potato Museum near Washington, D.C., were pleased to participate in the making of an exhibit that finally gives the versatile tuber its due.

Our interest in the potato began 16 years ago in Belgium where my husband, Tom, was teaching school. We observed the impressive number of varieties that grow there, and he decided that a study of the vegetable would make a good class project. His students were soon immersing themselves and us in myriad potato facts and history.

Solid, yet 80 percent water, the potato is not a root as is sometimes thought but a tuber, the food-storage unit for the green foliage above the ground. Its botanical relatives in the Solanaceae family include the tomato, pepper, eggplant, petunia, tobacco plant and deadly nightshade. Potatoes have grown in South America for

at least 13,000 years. Anthropologist Tom Dillehay of the University of Kentucky discovered ancient tuber peels in a swamp in Chile. He carbon-dated his find to 11,000 B.C. and sent the peels to ethnobotanist Donald Ugent at Southern Illinois University. Ugent determined that they were a wild species of potato, the oldest ever found. He also identified the 10,000-year-old remains of the oldest cultivated potato. Clearly this New World food is as ancient as Old World grains, and its cultivation indicates that the Fertile Crescent was not the only region with early agriculture.

The Inca grew the potato as they created their vast empire, fueling widely dispersed soldiers with the first processed portable potato—a freeze-dried product known as *chuño* that had been developed by their ancestors. Chuño is still prepared by Andean Indians, who spread potatoes on the ground at night and leave them to freeze. During the day whole families come out to stomp on them, pressing out the water. The process is repeated for several days until the light-as-air, desiccated tubers are ready for storage.

The Spanish, who first brought the potato to the attention of those outside the Americas, were relatively indifferent to the vegetative gold they stumbled upon in the early 1500s. Bruising their way through what is now Peru, Ecuador, Bolivia and Chile in search of mineral riches, the conquistadores almost certainly ate some of the small tubers, however. And they observed how well the potato fed the slaves required to run colonial silver mines. They took the vegetable home to Spain, where records indicate it was experimentally served up to human guinea pigs in a Seville hospital in the early 1570s.

From Spain, monks purportedly carried the tuber to

Photographs by Martin Rogers/Woodfin Camp

Still a curiosity at the time of this 1613 engraving, Peruvian *papa* was Latinized as *Papas Peruanorum.*

Agriculturist A. A. Parmentier, holding blue potato-plant blossoms, studied tuber in the 18th century.

Italy. Papal legates are credited with its dispersal at least as far as Belgium. Herbalists cultivated it as a curiosity, believing it had aphrodisiac qualities. French botanist Charles de L'Ecluse, or Clusius, obtained two potatoes in 1588 and wrote, a trifle wistfully, in his *Rariorum plantarum historia*: "It is indeed to be wondered at that knowledge of the plant has come so late to us . . . for it is said that they [Italians] used to eat the tubers . . . cooked with mutton in the same manner as they do with turnips and the roots of carrots. They actually employed it for fodder for pigs."

Such acceptance was slow in coming elsewhere. Europeans had never seen an edible tuber. When leprosy and tuberculosis broke out in regions where this relative of poisonous deadly nightshade had recently been introduced, the strange new plant was blamed.

But gradually the potato's value as a safe, nutritious food was recognized, and European explorers, traders and missionaries began carrying it with them on their travels around the world. Written records of the potato's dissemination are sparse. Introduced into China and Japan in the 17th century, there are indications it reached New Zealand in the 1700s. Other early accounts place it in Africa, India and Southeast Asia.

To reach our shores the potato traveled back across the ocean from Europe and quietly took root in North America. Captain John Smith is said to have observed that potatoes were planted in Virginia in about 1620, and in 1685 William Penn noted that they were grown in Pennsylvania. Potatoes were purchased by Harvard College for a banquet in 1708. In 1719, Scotch-Irish settlers in New Hampshire began intensive potato production.

As the 18th century progressed, potatoes were mentioned more frequently in diaries, letters and other written accounts. George Washington planted them at Mount Vernon in 1767, and by 1772 Thomas Jefferson was serving potatoes at Monticello. Found on rations lists for both the American and British militaries during the Revolution, the potato also fed the civilian population. Referring to the Crown's trade restrictions at the time, John Adams wrote to his wife, Abigail:

Meredith Hughes is now working with the Potato Museum board to establish the World Food Museum, envisioned as a network of food-related institutions.

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Pre-Columbian twin-tuber pot features a whistle that blows when water is poured from opposing spout.

A woman and child scratch through a field in search of healthy potatoes during the great Irish famine.

"Let us eat potatoes and drink water; let us wear canvas, and undressed sheepskins, rather than submit. . . ." Clearly potatoes were not all that high on Adams' list of delicacies.

While North Americans added the potato to an already lengthy list of foods that thrived in the rich soils of the New World, in the Old World, too, it was becoming essential. French chemist and renowned agriculturist Antoine-Auguste Parmentier, serving in the French Army during the Seven Years' War, survived captivity by the Prussians in 1757 by eating a favorite German food, potatoes. His appreciation for the vegetable's considerable merits led to his later research on it. He explored proper potato cultivation and demonstrated in experiments that the potato was a safe, nutritious food. Parmentier may have pushed too hard for it. When he was about to be nominated for a municipal post, one of the voters declared in opposition: "He will make us eat nothing but potatoes, he it is who invented them!"

Popular or not, the potato had a profound impact on much of Europe during the 18th and 19th centuries. For the first time the poor had an easily grown, easily processed, highly nutritious food that could be raised in small, family plots. One acre planted in potatoes could feed four times as many people as an acre planted in rye or wheat. University of Maryland historian Mary Matossian found that a dietary change from grains, such as rye, to the potato contributed significantly to population growth throughout Europe between 1750 and 1850. Prior to that, Matossian believes, difficult-to-detect, poisonous microfungi that occurred periodically in the grains that people ate weakened their immune systems. This made the populace susceptible to epidemics, causing high death rates.

Feeding soldiers, prisoners and civilians

Low in fat, high in vitamins and minerals, the potato also proved to be a safer food than grains. More children survived to adulthood. Since they were not all needed to help run their families' farms, many of them went to the cities to work. By more efficiently feeding an expanding working class, the potato helped power the Industrial Revolution, according to the late Harvard historian William Langer.

Burgeoning populations not only peopled the new factories but also swelled the ranks of armies. The potato fed soldiers and their prisoners, as well as beleaguered civilians and refugees affected by wartime shortages. Indeed, the vegetable's value during wartime was recognized early on, and acreage planted in the spud increased significantly with each successive European conflict.

In 1778 the Prussians squared off against the Aus-

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In Ireland today, the potato is still a major crop, sold from small family plots and at supermarkets alike.

trians in Bohemia. The Bohemians watched their stores of potatoes dwindle as both armies, strategically equal, ate potatoes and exchanged shots sporadically. Finally the chill winds of winter, and the ingestion of the last potato, sent the Prussians scuttling for home. So much for the grand War of the Bavarian Succession, known more popularly as the Potato War.

Anthropologist Jack Weatherford has suggested that the gradual rise in influence of northern countries, such as Germany and Russia, as the more southerly France and Spain declined from the mid-18th century on, could well stem in part from the potato's establishment as a staple in those cooler, wetter areas.

Nowhere has the potato seemed so completely at home as in moist, cool Ireland. How the potato arrived in Ireland is unclear, but by the 18th century the Irish, who had previously relied almost exclusively on oats and milk for their everyday food, were eating 8 to 12 pounds of potatoes apiece each day—and little else. A family of six could survive on a 1½-acre plot. Potatoes sustained the peasants as they labored to pay for their plot by working the better lands for the landlord. These were often planted in grains, but the grains were either exported to England or fed to animals ultimately served up at English tables. The total dependence of the peasant on the potato led to an almost cashless society—and set the stage for disaster.

Like all growing plants, the potato is a product of the seamless cooperation of sun, soil, temperature and water, with the potato favoring more, rather than less, water. Therein lies the dilemma. While potatoes thrive on moisture, so, too, does the potato's worst affliction, late blight. Striking first by attacking the leaves, *Phytophthora infestans* spores move down the stem, eventually reaching the tubers in the ground. Even those potatoes harvested and stored may carry the fungus and be wiped out.

The blight hit Irish fields in 1845, blackening the plants and rotting the underground tubers. Dependent on this single crop for their food, and lacking cash or commodities to barter for grains, the people were destitute. Thousands of farmers were evicted from their homes. Roving groups of men, women and children huddled by the roadsides around wispy fires, eating grass. Those who didn't die from starvation fell victim to typhus, dysentery and scurvy.

Some landlords aided their tenants by reducing rents or distributing grains. Many more did not. Government relief efforts were poorly organized and came too late. At least 1 million and perhaps as many as 2.5 million people died. Another estimated 1.25 million Irish emigrated, most to the United States. The blight hit elsewhere in Europe, but with less devastating results, and ultimately the potato recovered.

It figured prominently in World War I. Already well established in the Teutonic arsenal, the potato helped sustain the Kaiser's army when food shortages were widespread. While living in Belgium, we were told that American doughboys, enjoying delicious twice-fried potato snacks, named them "French fries," evidently not realizing they were buying the treat from French-speaking southern Belgians.

Banquet of the Académie Parmentier, with potato candelabra, features food promoted by society's patron.

In Andean highlands of Peru, potatoes are planted on terraced hills in November for harvest in early May.

The English turned to potatoes when German U-boats attempted to blockade British ports. Farmers labored to increase their potato production, while home gardeners set out to double their yield. "The Potatoes Order—Defence of the Realm," a study on the urgent need for Britain to revitalize its agriculture in view of the war threat, was circulated. When we asked to see a copy in the British Library a few years ago, the request slip was returned to us with the notation, "It is regretted that this work was destroyed by bombing in the Second War."

By World War II, the German military was using potatoes to fuel machines as well as men. Some of their aircraft flew on potato-derived alcohol, which also powered streetlights, stoves and ground vehicles. The French appropriately dubbed their entrenched German enemy *doryphores*, their name for potato beetles, the plant's tenacious predator, because they knew the Germans were going to wipe out their potatoes just as the voracious insects were known to do. The value of the vegetable was acknowledged during the Siege of Leningrad. Malnourished Russian potato scientists nearly starved to death rather than eat a precious cache of seed potatoes that they guarded with their lives.

Today the Soviet Union is the world's number one producer of potatoes. Astonishingly, the rice-loving Chinese are number two, having recently displaced Poland in that spot. Poland's potato production was seriously disrupted in 1980 when the late blight broke out, reducing the crop by half. Since 60 percent of that crop was fed to animals, farmers were forced to slaughter the livestock they were unable to feed. The result was chaos—a sudden oversupply of meat on the market, followed by equally drastic shortages. The political crisis involving the labor union Solidarity, and the election of its leader, Lech Walesa, to the country's presidency, was precipitated in part by this 1980 crisis in food supply.

The search for the cause of the blight that ruined the Polish and Irish plants has preoccupied researchers for years, and in fact led to the creation of a new branch of science called plant pathology, the study of plant disease. The Rev. M. J. Berkeley, a 19th-century naturalist, first recognized that the fungus appearing on the potato plants in 1845 in Ireland and elsewhere was not the result of the blight but, in fact, the cause. Working in Germany, another scientist, Heinrich Anton de Bary, proved Berkeley's theory by identifying the fungus as an outgrowth on the host. It took another hundred years, however, before the mystery of the origin of the fungus was solved, and the pathogen itself was traced to central Mexico.

Late blight has traditionally been held in check with costly chemical fungicides. Unfortunately, more chemicals are applied to potato plants than to any other food plant. For subsistence farmers in developing nations, the chemicals are too expensive, if available at all. In the 1930s Cornell University potato breeder Donald Reddick found wild potato species with strong resistance to the *Phytophthora infestans* growing in Mexico. If the potato is to be the hope of the green revolution of the 1990s, picking up the banner carried by im-

KP to an American soldier usually means one thing: peeling potatoes—the fuel of armies for centuries.

proved strains of wheat and rice in the '50s and '60s, it must be done with the varieties resistant to late blight developed since Reddick's discovery.

The breeding of resistant potato cultivars has been a major part of the life work of John S. Niederhauser, World Food Prize laureate in 1990 and member of the Potato Museum's board of directors. Niederhauser, once described as "the only international agricultural research center that walks around," is best known for promoting better potato-growing techniques worldwide. Under his guidance, national potato programs, as well as international cooperative efforts, have helped boost potato production by four to six times over the past 40 years in countries such as Mexico, Pakistan, India, Turkey and Bangladesh.

One of the newest such endeavors was set up in August 1990. The International Cooperative Late Blight Project, based in Mexico, was founded by scientists from Poland, Mexico, the United States, Canada and the Netherlands, along with the International Potato Center in Lima, Peru. The program will further insure the dissemination of blight-resistant cultivars wherever potatoes are grown.

The importance of the potato goes beyond the feeding of nations. "Industrial" potatoes have been around since the 1800s, when potato-starch derivatives were used as sizing agents in the cotton industry, and in a thick syrup lavished on pancakes.

Today potato starch is used in the production of paper, adhesive and textile goods, and in edible binding agents and low-fat food additives found in a wide range of processed meals, soups, bakery goods and desserts, including ice cream. The potato yields up a superabsorbent biodegradable material for use in disposable diapers. It provides starch products to keep oil-well drilling bits smooth and to hold together the ingredients in lipsticks and cosmetic creams; it is used to produce a substance that releases, when called for, the medicines in pills and capsules; and it provides another substance that works as a flocculation agent in water purification systems, replacing petroleum-based chemicals.

In Princeton, New Jersey, the infinite possibilities for potato-starch applications absorb Fred S. Kaper, the president of AVEBE America, a subsidiary of the Dutch industrial-potato firm. "Watch this," he said to my husband and me during a recent visit. He plopped a white, slightly elongated piece of packing "popcorn" into a glass of water on his conference table. In a matter of seconds, the glob of pure potato starch disappeared, dissolved into the water. We gazed at the glass, wondering if we were watching a solution to the world's landfill problems. Will fast-food consumers soon be tossing their burger "shells" into a vat of water on the way out the door? Perhaps. Novon, a division of the Warner-Lambert Company, in Rockford, Illinois, is about to begin producing a wide range of degradable packaging products made from tiny potato-starch pellets. Also in the works are potato-starch golf tees that will disintegrate in the rain.

Though well recognized now as a wholesome food, the potato may not be healthful for some people. According to University of Florida horticulturist Norman Childers, arthritis sufferers in particular may do well to let the potato alone, along with the tomato, pepper and eggplant. Childers claims that toxins in plants of the nightshade family can exacerbate or even cause arthritis in people who are sensitive to them: some 10 percent of the population.

"I see no reason to glorify its peel"

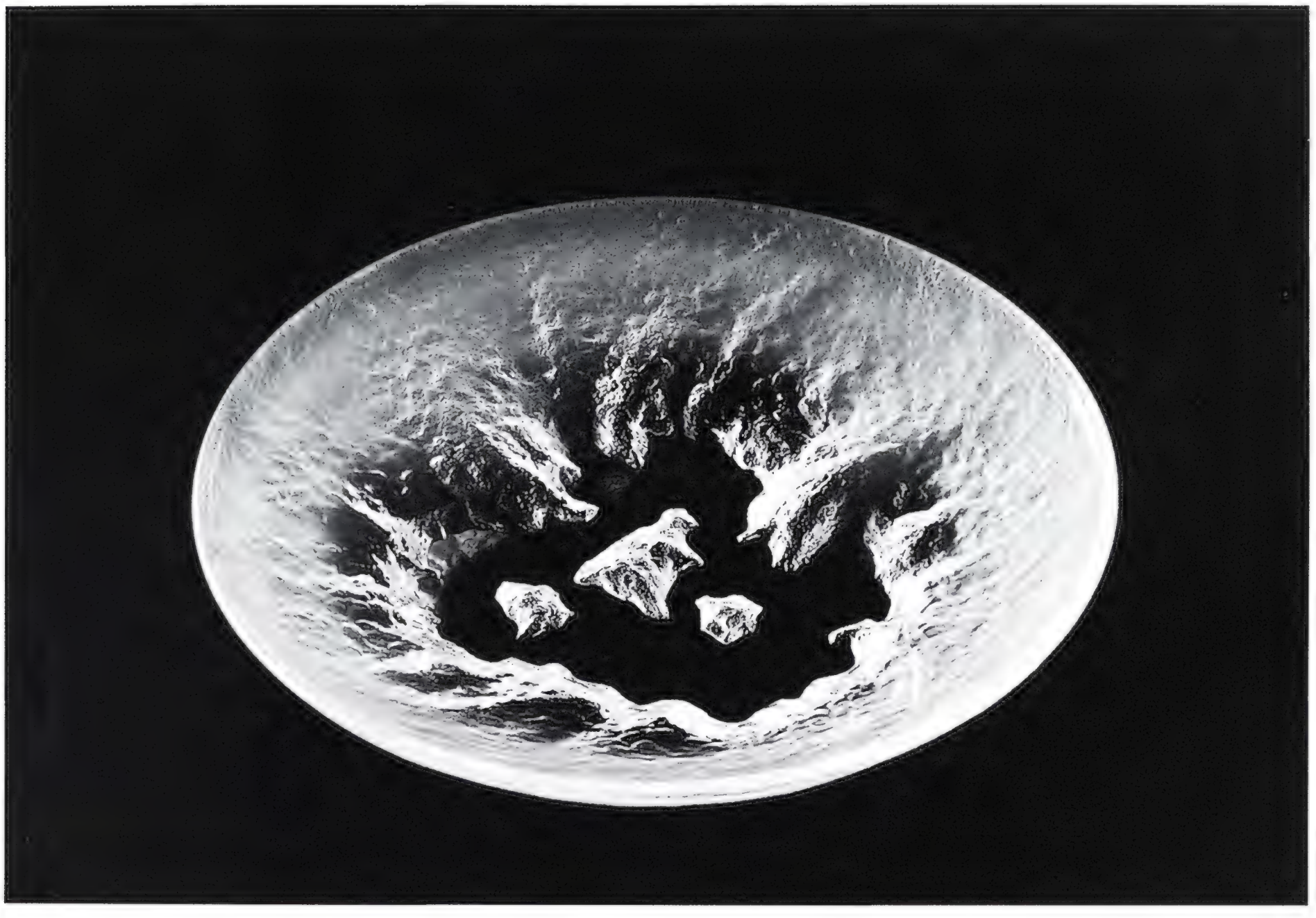
The toxic elements tomatine, in tomato plants, and solanine and chaconine, in potatoes, are among a host of glykoalkaloids and steroids occurring naturally in these plants. There is evidence that much of the trouble with these vegetables arises after harvest, during storage and subsequent handling. Light, in particular, adversely affects the tuber, causing the telltale greening of the skin that indicates the existence of too much solanine close to the surface and thus making the entire potato unfit to eat.

Cornell University biochemist Nell Mondy thinks that the problem is in the peel. Despite what your mother and mine told us, Mondy has found that nutrients are not concentrated in the peel—but solanine is. "The potato is a great food," she says. "However, I see no reason to glorify its peel, which is the potato's main weapon against attack and its chief means of protection against insects and nematodes [spud-loving worms], as well as Man. Under stress from light, handling and agrichemicals, the potato builds up toxic compounds

THE MOON IS MY OWN

ON THE LAKE

MILES OF FROST



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MUSEUM CRYSTAL
HOYA

Unearthed and ready for picking, spuds can be eaten or turned into vodka or maybe even golf tees.

in the peel in order to protect itself." A Philadelphia surgeon who raises earthworms for fishing sent a fan letter to Mondy saying he had been puzzled by the fact that each time he put potato peels on his compost pile the worms, hearty eaters, refused to touch them. He is puzzled no more. The Indians of the Peruvian Andes peel their potatoes, as do cooks in many other parts of the world. Custom often has as its basis past experience that is not always obvious.

The potato's 450-year written history gains new pages with stories that find their way to the Potato Museum from around the world. Doctors in India claim to have successfully used potato skins as a dressing on burn victims. Potato protein may soon contribute components to an artificial blood serum for human use. Biochemist Jesse Jaynes, working with scientists at the International Potato Center, has engineered a higher-protein potato that he estimates will be feeding people in developing countries within the next five to ten years.

In China, the people labor to wed Western technology to abundant Eastern production. Near the close of a potato conference that we attended there not long ago, we joined a group of scientists set to tour one of Kunming's newest sources of pride—a modern potato-chip factory.

As we all shuffled into place, the machines were turned on and conveyor belts started bouncing spuds into the peeling and slicing machines. The sliced chips poured into hot fat, then drifted under a shower of spices and began the steep climb up to a chute, which would drop them down into waiting bags.

Without warning, chips began blasting out of the machine. They shot up toward the ceiling and then fell like leaves to the floor. Could we help but recall Shakespeare's words (in reference, however, to the sweet potato), "Let the sky rain potatoes"? With sirens blaring, the system shut down. We commiserated with our disconcerted hosts on the difficulty of managing such machinery, and filed back out into the hot sun. Flies buzzed above huge wooden vats that were filled with a starchy pulp made from the factory's peelings. "Wonderful food for our pigs," explained one worker, beaming. For him at least, the potato-chip factory is a success.

As we walked away to climb back on our bus, the scene reminded us that the potato's triumph is not found in its tasty but frivolous, fat-laden processed products, but in its substantial gift of nourishment to feed the world's peoples—and even their pigs.

Mr. Potato Head goes to bed (when you're almost 40, some things come off and go on the nightstand).

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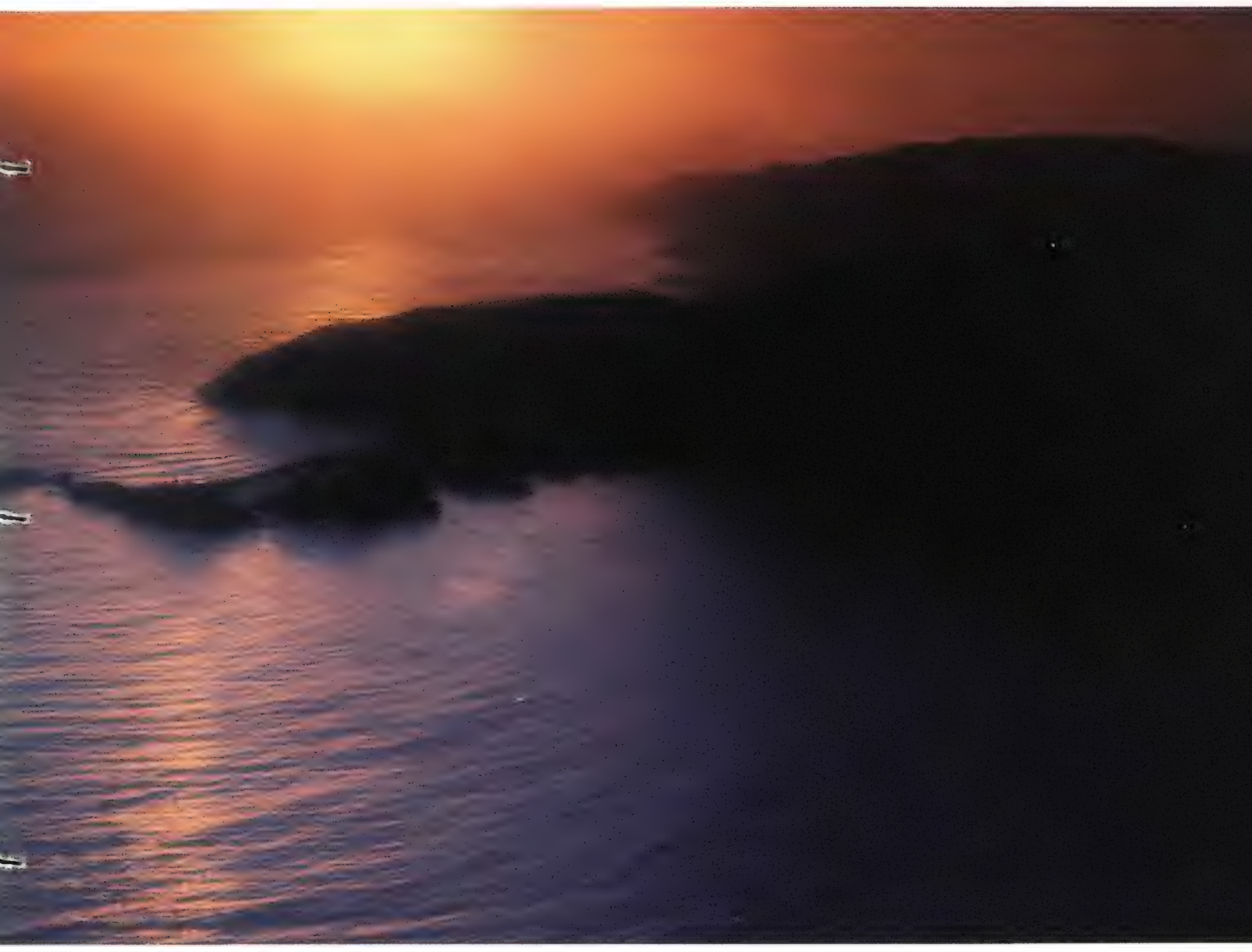

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THE RITZ-CARLTON
PALM BEACH

Casino overlooks pleasure craft moored in Avalon Bay on a still morning. Built by gum magnate William Wrigley jr. in 1928-29 for $2 million, the colossal structure houses 1,250-seat theater below the ballroom.

By Charles N. Barnard

On Santa Catalina Island, the kings of swing held sway

Its huge Casino Ballroom was famous during the Big Band Era, but there is more than music to the magic of this Camelot-by-the-Sea

It started out as a millionaire's dream of a Moorish-style "pleasure palace" on a magical isle. It became the Casino Ballroom on Santa Catalina Island, one of the largest dance halls ever built and the showplace of an epoch. Now in its seventh decade and still going strong, it's a living monument to the Big Band Era of the 1930s and '40s.

It was on May 15, 1934, that radio listeners across the country first heard a mellifluous voice announce: "From the beautiful Casino Ballroom overlooking Avalon Bay at Catalina Island, we bring you the music of Irving Aaronson and His Commanders." Later it would be Kay Kyser, Freddy Martin, Jimmy Dorsey, Harry James and all those other dashing knights of the bandstand. A generation of young couples made the 26-mile crossing from the Southern California coast to swing and sway the night away at that Camelot-by-the-Sea. Other famous halls of the period have long since fallen to the wrecker's ball, but sometimes, on New Year's Eve or Halloween, hundreds pack the Casino's hardwood floor once again.

The magic is still there. On a quiet summer evening

Hundreds danced to the music of the Curt Houck Band in 1932. Ballroom atmosphere was romantic yet relaxed. Couples gathered around bandstand (under curtain arch, at rear) to hear vocalists.

not long ago, I sat almost alone in the cavernous interior and discovered that it requires only a slight tug of nostalgia to stir vivid memories of Benny Goodman and his band playing "Sing, Sing, Sing."

How and why did this curious bit of Americana happen to happen here? Santa Catalina is one of Southern California's several arid, craggy islands. And for almost four centuries following its discovery, Catalina seemed no more than an unpromising outcrop, rumored to have been visited only by pirates, smugglers and other unsavory entrepreneurs. As California grew more populous, the island—near enough to reach by boat in a couple of hours, yet far enough to seem private—first began to attract a few sheep and cattle ranchers, then hopeful gold miners, then fishermen. All were minimally successful, but Catalina would eventually evolve into a rustic hideaway for weekenders and summer campers.

Avalon has always been Catalina's only real town. Al Jolson made its name familiar with the 1920s lyric: "I found my love in Avalon beside the Bay / I left my love in Avalon and sail'd away . . ." In Celtic mythology, Avalon is an island paradise in the far western seas. And it was to the island of Avalon that the mortally wounded King Arthur went after his final battle. The real Avalon is a one-mile-square village of more than 2,500 residents, a place that has itself acquired a certain mythical cachet.

Catalina came to be associated with Hollywood stars and the popular films they made there: Clark Gable in *Mutiny on the Bounty*, Gloria Swanson in *Sadie Thompson*, Errol Flynn in *Captain Blood*. And stored away in the files of the Catalina Island Museum Society one can find photo-

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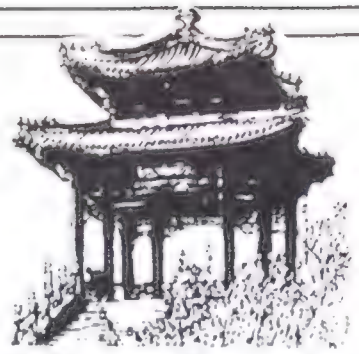

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Overlooking the harbor from a 350-foot hill, the William Wrigley house (top left) is ideal for viewing both sunrises and sunsets.

graphs of Zane Grey or Herbert Hoover or Winston Churchill or Cecil B. DeMille, each of them standing next to a giant, hung-by-the-tail marlin. Sport fishing was very big at Catalina in those days.

Finally, along with all the other big names, there was chewing-gum magnate William Wrigley jr., the master salesman and promoter from Chicago who bought the whole island, sight unseen, one day in 1919. The Chicago Cubs were already his property, and soon the team was holding its spring-training camps on Catalina. The boss was convinced island seafood and fresh ocean breezes would help his charges win a National League pennant. Wrigley had a special window cut into the side of his hilltop mansion so that, it was said, he could watch the Cubs practice on the diamond he had built for them. Sometimes he preferred to survey the action from center field—on horseback. Invariably his advice to young players was, "Keep your eye on the ball."

Charles N. Barnard, travel editor of Modern Maturity, *is a lover of any kind of island, musical or otherwise.*

Catalina was "discovered" in 1542 by Juan Rodriguez Cabrillo, a Portuguese navigator who claimed it for Spain. The native islanders had been there for some time, but European diseases would eventually decimate the population. American and Russian sea-otter hunters came ashore in the early 1800s. Mexico acquired sovereignty in 1822, only to lose it after the Mexican War in 1848.

In 1887, the island was bought for $200,000 by entrepreneur George R. Shatto. He inaugurated regular steamer service to the mainland, built a rambling wooden hotel with a long front porch facing the bay and ordered surveyors to lay out the street plan for a vacation town—Avalon. Tiny lots were sold for as little as $150 or leased for the summer. Owners and renters alike put up shacks or platform tents. Catalina was where escapists went to camp, fish, swim and view underwater gardens of extraordinary color and beauty.

After four years Shatto went broke and sold out. A family named Banning soon took over. Even though the population of adjacent Los Angeles was just over 50,000, various pleasure

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boats equipped with restaurants and fancy salons were now bringing visitors to the island regularly. The Bannings went about creating a new tent city on a larger scale. By 1913 Avalon's summer population was reportedly 10,000. Two years later, however, the Bannings' dream of creating what amounted to a precursor of Club Med, complete with stagecoach rides and other amusements, went up in smoke when a fire roared through part of Avalon. William Wrigley jr. entered the picture in 1919, after the Bannings' rebuilding efforts failed.

Catalina was about to be transformed. Wrigley was at the height of his considerable promotional and commercial powers. In addition to the Chicago Cubs, he owned real estate of untold value in Illinois, Arizona and California. The $3 million he reportedly paid for Catalina was a trivial sum to him. Two weeks after he closed the deal, he made his first trip to the island. Fog obscured Catalina as the ship with Wrigley aboard approached from the mainland. When the curtain of mist lifted and revealed a mountainous prospect, Wrigley expressed surprise: "My goodness, I thought it was flat."

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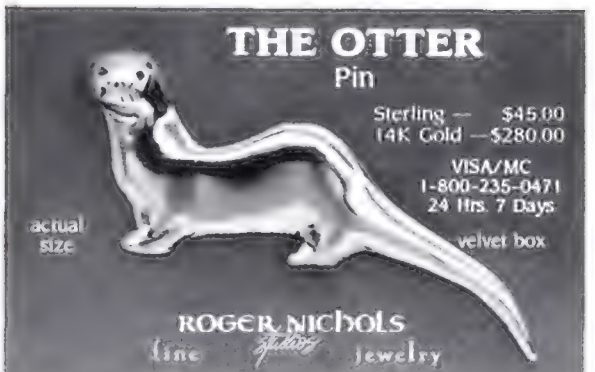

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Wrigley was a mystery to the locals. He came and went without notice or fanfare, but seemed to take enthusiastic and personal interest in many projects when he was there. He was given to the boundless boosterism and snappy aphorisms that were characteristic of the times—"Nothing great was ever achieved without enthusiasm." "A man's doubts and fears are his worst enemies." He often went about on horseback, a portly, shy man in polished boots and tailored clothes.

Wrigley never envisioned his island solely as a means of making money. He saw it as something of an experiment in Utopianism. Catalina, he said, would be a resort for Everyman, a self-sufficient community, a refined sort of retreat, "not a Coney Island" but a haven of beauty and tranquillity.

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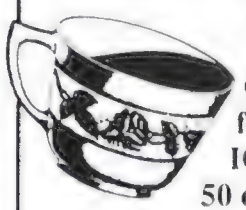

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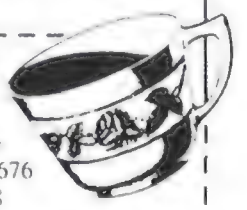

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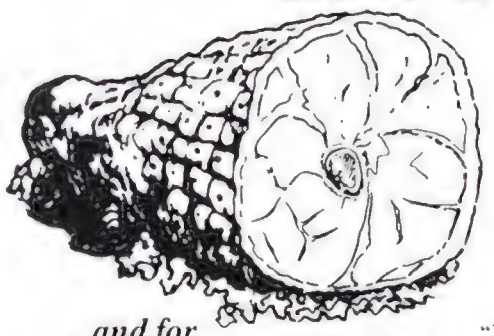

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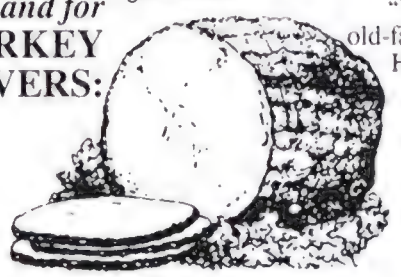

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hotels started and a second movie theater added. A 1,600-passenger Great Lakes steamer (see page 34) renamed the *Avalon* was sailed down the Atlantic coast and through the Panama Canal to the island resort. Later, a new steamer, the *Catalina*, was built to carry 2,000 passengers.

The original tent city became the Island Villas, consisting of 1,000 "bungalettes" (Wrigley's upgrading included siding and wooden floors and walls, with canvas window coverings) in which, brochures claimed, two or three people could "nestle" for $12 to $17.50 a week. When Canvas Cottage City added 1,500 new bungalettes to this summer encampment (for a total of 5,000 or more nestlers) it became the basis for a wry Catalina boast: "We have the largest one-story hotel in the world."

On a hillside overlooking Avalon, Wrigley built his palace, a 22-room, Georgian-style mansion located so that he and his wife, Ada, could see both sunrise and sunset. He named this promontory Mount Ada. The house, now an expensive bed-and-breakfast establishment, is distinguished by broad verandas with spectacular views. In the idiom of the day, Wrigley called it a "cottage."

Motion picture companies, which had begun using Catalina as a location in 1914, visited even more frequently after Wrigley's arrival. More than 400 movies (or parts of movies) have been made on the island, including one based on Zane Grey's *The Vanishing American.* It may have been that 1925 production which imported 14 bison, then left them behind after filming was done. These animals have now multiplied (the herd is currently kept between 100 and 150) and roam freely in the interior of the island. Some are slaughtered every year, and buffalo burgers are served at several local restaurants.

By the late 1920s, with the annual visitor total already surpassing 400,000, it was possible to count nearly 30 enterprises that Wrigley's conglomerate was operating—steamships, hotels, a factory that produced 15,000 red roof tiles a week, a municipal waterworks, a furniture factory, a poultry ranch, a fleet of glass-bottomed boats, a quarry with a rock crusher, the major-league

Errol Flynn (left) parries thrust by Basil Rathbone during a duel scene in *Captain Blood*, which was filmed on Catalina in 1935.

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Band leader Kay Kyser (front row, center) and vocalist Ginny Sims (on Kyser's right) lead parade after arrival on steamer.

training camp, a herd of cattle—and something called the Sugarloaf Casino, a small, octagonal dance hall constructed in 1920 on a prominent point of Avalon Bay.

Like his predecessors, Wrigley offered packaged trips to the island. In 1920 for $10 a visitor bought passage on a steamer, meals, a night's accommodation, dancing at the Sugarloaf and a ride in a glass-bottomed boat. Advertising and promotion brought ever bigger visitor totals: 622,000 in 1926 and 700,000 in 1930.

The daily "steamer greeting" at the Avalon pier was an event around which the community's life was regulated. Wrigley's two great white steamers brought the people who affirmed Catalina's reason for being—ordinary vacationers as well as the occasional celebrities who promoted both the island and themselves. All arrived smiling and waving on Avalon's dock and all were duly cheered, photographed and serenaded while a genuine "radio announcer" acted as master of ceremonies. Daily!

But many of the latter—Hollywood personalities—crossed the channel by private yacht: Wallace Beery, Gloria Swanson, Hedda Hopper, Victor McLaglen, John Wayne, Jean Harlow, Ward Bond, Douglas Fairbanks sr., Mary Pickford, Dolores Del Rio, Mickey Rooney, Errol Flynn. Despite the fanfare, Catalina proved to be a quiet haven—far from the clutches of autograph hounds.

The popularity of ballroom dancing was sweeping across America, and it wasn't long before the small dance hall at Sugarloaf Point became inadequate. Early in 1928 plans to build something much larger on the same point of land got under way. Some 500 laborers and artisans mixed 100,000 sacks of cement, erected 2,500 tons of steelwork, installed 50 miles of electrical wiring, fitted 105,000 roofing tiles, cut 500 square feet of 22-karat gold-leaf decorations.

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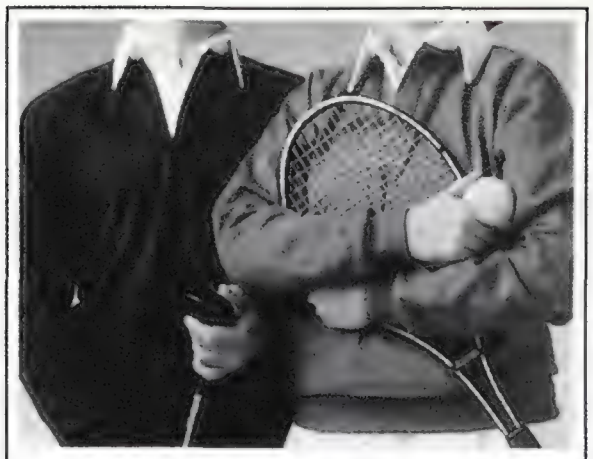
circular dance floor of maple, white oak and rosewood on a resilient subfloor of pine and cork. Below the dance hall, which was on the second floor, they built the 1,250-seat Avalon Theatre. Appointed with plush furniture made on the island and decorated with a series of vivid Art Deco murals, the opulent movie house was one of the first theaters to be acoustically engineered to accommodate the new "talkies."

The Casino opened on May 29, 1929. Curiously, William Wrigley was not there. Some said that, after ten years, it was a sign he was losing interest in Catalina.

From 1929 to 1934, the Depression notwithstanding, bands provided music for dancing year round. Admission was free (all patrons were considered "guests of the Wrigleys" even though the hosts were almost never present) and the dress code and house rules were strict: no alcohol allowed on the premises even after Prohibition ended, no dancing "too close," ties and jackets for the men, dresses for the women. Dancers could refresh themselves between sets at a soda

Comedian Stan Laurel (of Laurel and Hardy fame) shows off his marlin.



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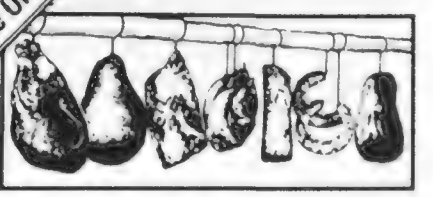

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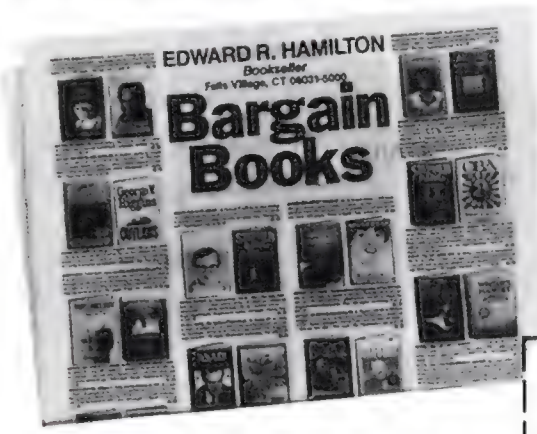

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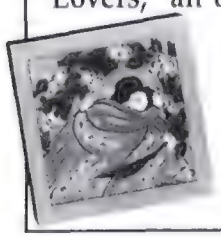

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fountain that served phosphates and sundaes named "Wrigley Welcome" and "Avalon Temptation."

William Wrigley jr. died in 1932. A memorial service was held in the Avalon Theatre. The organist played "Beautiful Isle of Somewhere." Wrigley's body was sealed in a 130-foot-high Art Deco mausoleum at the head of Avalon Canyon.

The Casino's greatest fame, and the island's, came after Wrigley's death. Philip K. Wrigley took over leadership on Catalina. Like his father had in the 1920s, Philip launched a major renovation of the town. "We have already spent millions of dollars on Catalina," he said. "I guess it won't hurt us to put a few more millions into it." Tons of white sand were imported to cover the naturally pebbly beach, and towering palm trees were transplanted from Pasadena. To give Avalon's waterfront a Mediterranean look, buildings were stuccoed, bus drivers were given Spanish costumes, and decorative tiles were laid into city walkways, curbsides, buildings and walls. For the final touch, the vacationing "guests" would now be greeted at the dock by caparisoned Arabian horses and their riders prancing to the rhythm of a mariachi band.

Franklin D. Roosevelt was in the White House, the Depression was at its depth and Americans were still crazy about dancing. Most of the famous bandleaders of the period, attracted by the spectacular Casino Ballroom, came to the island for engagements of four to ten weeks. By 1940, regular CBS radio broadcasts had made Catalina nationally known, and crowds were at their peak. More than 6,200 people came to hear Kay Kyser on May 8, 1940, the ballroom's all-time one-night record.

Old-timers still remember how the famous bandleaders and their musicians became a part of island life. The big names occasionally stayed at Philip Wrigley's own substantial home (not far from the Wrigley mansion) or rented a house of their own; the band members occupied the same cottages that were reserved for the Cubs baseball players in spring. Youngsters made extra money by renting their bikes to the musicians or pulling their groceries home in little red wagons. Charter-boat captains would take band members—often still in their

tuxedos—on fishing cruises after the Casino closed at 2 A.M.

Some big bands had recurring engagements in the Casino in the years before World War II, including those of Jan Garber, Ted Weems, Dick Jurgens and Hal Grayson. Radio shows featuring dance music were becoming popular, so Wrigley arranged for nightly broadcasts from the Casino Ballroom. Among the earliest starring bands were Ben Bernie's (sponsored by Pabst Blue Ribbon beer) in 1935 and Little Jack Little's (for Chesterfield cigarettes) in 1936. Kay Kyser's show, the "College of Musical Knowledge," was broadcast from the Avalon Theatre every Wednesday night. In 1941, Bob Crosby and the Bobcats played the last peacetime Casino engagement before Pearl Harbor.

While war raged in the Pacific, the Casino's program of dances and coast-to-coast broadcasts continued. Though Santa Catalina was closed to tourism, servicemen all over the world heard big bands playing from the Casino Ballroom over the Armed Forces Network. Thousands of others who were trained or stationed on the island enjoyed dancing in the ballroom with their wives and sweethearts. Kay Kyser returned in 1944, along with such big-name entertainers as Danny Kaye and Dick Powell. Johnny Mercer played an engagement with singer Jo Stafford. Spike Jones and His City Slickers played there, too.

The war ended, the ballroom saw a few more busy summers, but the Swing Era was coming to an end and so was the heyday of the Casino.

In 1947, the Wrigley family decided to remove William Wrigley's remains from his mausoleum in Avalon Canyon and return the body to a family burial ground in Pasadena. Various explanations were given, but islanders saw the move as a further disengagement of "their" family from "their" island. Indeed, Philip Wrigley was trying to divest some of the island's money-losers. Several major concessions were leased. Labor problems cropped up for the first time. In 1970, *Forbes* magazine sharply criti-

The Ted Weems band, featuring singer Perry Como (front row, center), lined up near the Casino during a 1938 engagement.

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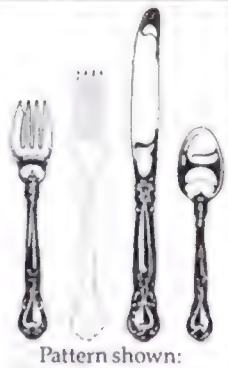

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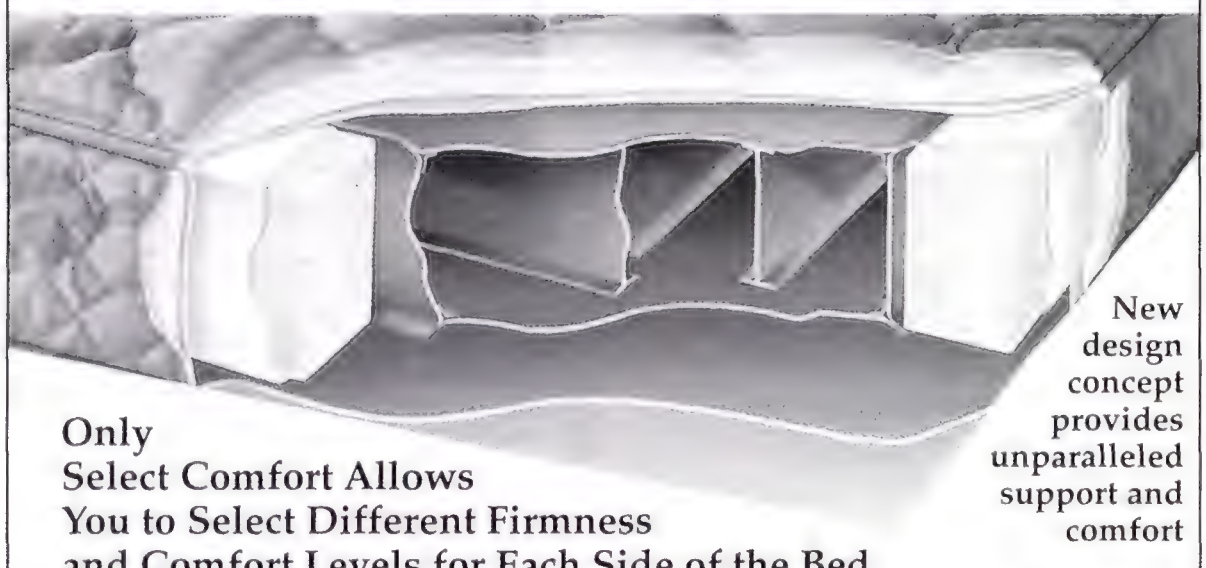

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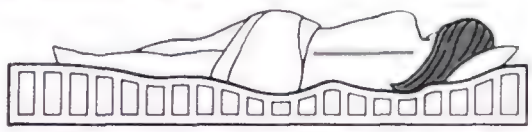

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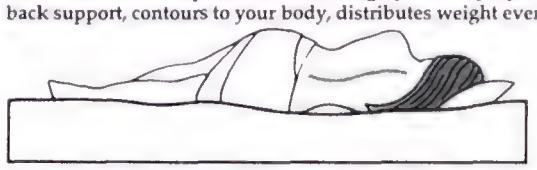

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cized Wrigley (who later sued) under the headline "The Island Kingdom of P. K. Wrigley," questioning private ownership of the island. Business was poor. From 1966 to 1974 there was no dancing at the Casino.

In 1975, the Wrigley family transferred 86 percent of their holdings on the island to the nonprofit Santa Catalina Island Conservancy. Within the town of Avalon, however, the family's Santa Catalina Island Company retained ownership of 70 percent of the land and several major buildings (including the Casino). The rest of the island was now in the hands of professional conservationists who would manage wildlife (including the buffalo herd), roads, the airport and other resources in the island's rugged interior.

After Philip Wrigley died, in 1977, his son William took over. Almost coincidentally, the island's old magic began to return—thanks in part to the 1980s real estate boom. A big-band revival brought many of the old names back to the Casino—Freddy Martin, Harry James, Woody Herman, Alvino Rey, the Glenn Miller Orchestra and the Tommy Dorsey Orchestra. Tickets were now $7.50 per person, and capacity crowds once again filled the dance floor.

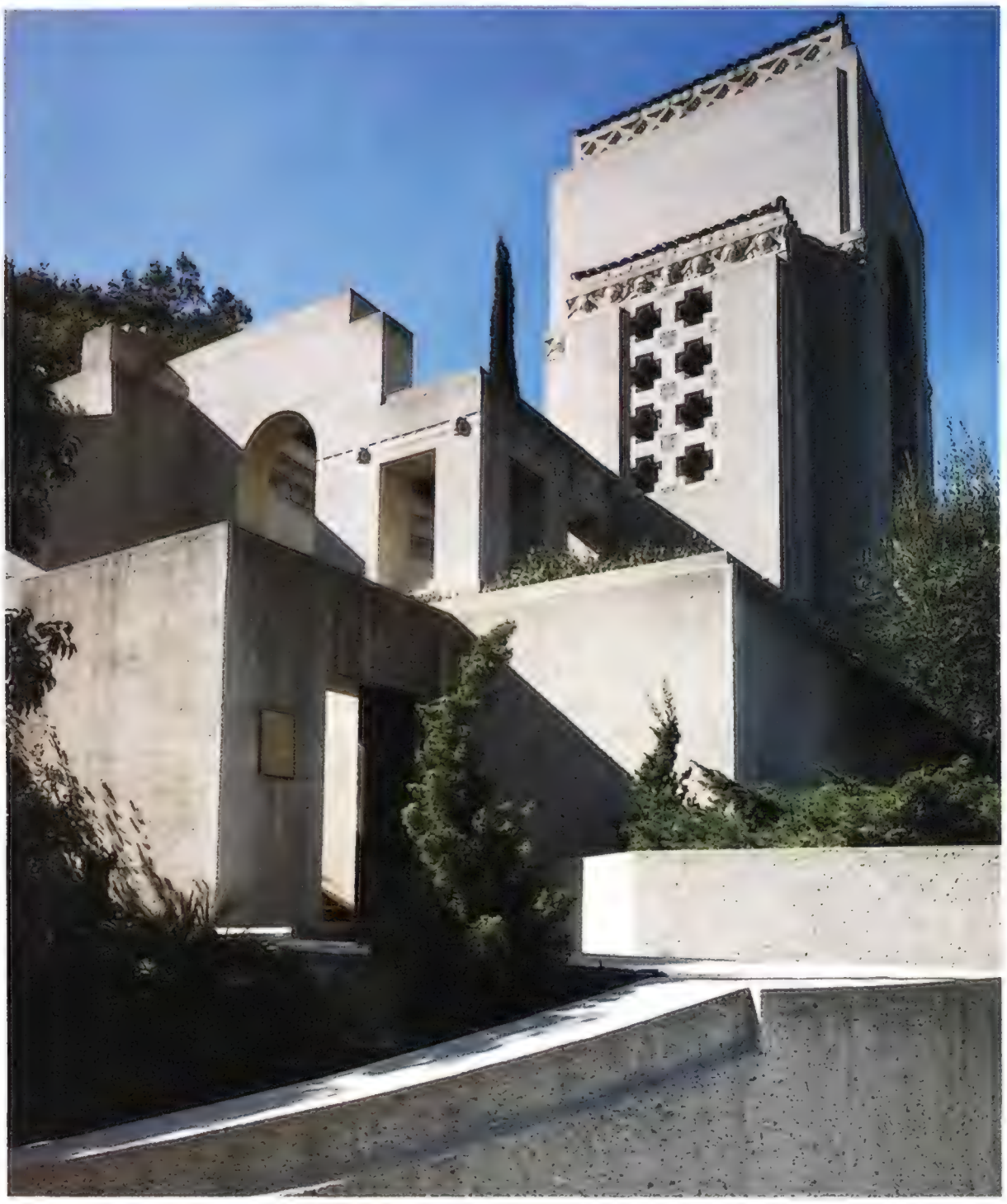
In the past decade, campers, hikers

and nature lovers have again been lured to Catalina's natural beauty. Glass-bottomed boats are still popular; buses have replaced stagecoaches on tours. New, small hotels are being built, and some homes have been converted to offer bed-and-breakfast accommodations. The beautiful harbor at Avalon remains a popular anchorage for yachts. Annual visitor totals now exceed the levels of the 1930s. Weekend crowds of up to 8,000 are not unusual in the summer.

Residents, many of them third- and fourth-generation islanders, are apprehensive about seeing Avalon's population rise to a projected 4,000 within the next few years. Ownership of motor vehicles is still restricted (most people get around in golf carts), but some locally produced smog is beginning to be noticeable anyway. A major condominium developer, unwelcome at first, is now completing a spectacular residential community.

And the Casino? Will its great days return too? "You better believe it," an attractive young woman assures me on the day I leave the island. "Come back on New Year's Eve if you want to see hundreds of dancers on the floor again. They'll be there!"

Art Deco memorial tower honoring William Wrigley jr. is also the site of an extensive botanical garden with plants native to Catalina.



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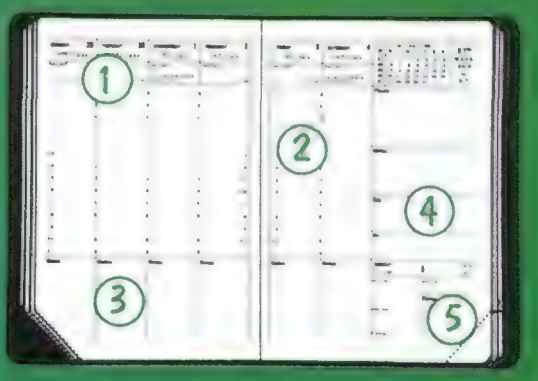

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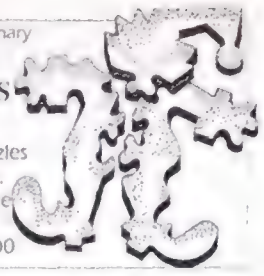

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Book reviews

A Tour Through the Whole Island of Great Britain
Daniel Defoe
Edited by P. N. Furbank, W. R. Owens and A. J. Coulson
Yale University Press, $45

What is the most famous scene in English literature? Dozens of possibilities come to mind, but certainly near the top must stand the spine-tingling moment when Robinson Crusoe discovers a footprint in the sand and realizes with a shock that he is no longer alone on his desert island. Even people who've never cracked a book know all about Crusoe; he has passed into myth like Sherlock Holmes and Tarzan. At times it seems that his creator, Daniel Defoe, might be a comparable larger-than-life figure, for few writers can have packed more action, intrigue and work into 70 years.

Born in 1660, Daniel Defoe managed to survive the Plague (1664-65) and the Great Fire of London (1666). He spent his 20s in various business ventures, taking time out to go a-soldiering; eventually he went bankrupt to the lively tune of £17,000. Bouncing back, he was for a while manager of the royal lottery. He also started to turn out the political, economic and satirical pamphlets that eventually led to his arrest for sedition and his public display in the pillory.

On the rebound from this disgrace, he became an undercover agent for the government—a spy—and seems to have been more than willing to alter political allegiances when necessary. During one decade (1704-13) he wrote an entire weekly newspaper himself, as well as the most famous ghost story of the century ("A True Relation of the Apparition of one Mrs. Veal"). Inevitably, he got himself thrown into prison. Nearing

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60 he decided to apply his skills to fiction and produced three masterpieces: *Robinson Crusoe, A Journal of the Plague Year* and *Moll Flanders.*

After six years or so, he gave up novel writing and went back to pamphleteering, eventually dying in 1731, on the run from his creditors. His complete works, most of them anonymous, are thought to number around 500, but no one—not even P. N. Furbank and W. R. Owens, who edited this edition and have written a book about the Defoe canon—is sure there aren't even more.

Among the high points of that voluminous oeuvre, though, is *A Tour Through the Whole Island of Great Britain,* an epic guidebook that originally appeared in three volumes (1724-26). This latest abridgment reprints a little less than half the material, leaving out Defoe's citations from earlier authors and the entries on some of the smaller towns, but making up for these excisions with nearly 300 contemporary illustrations—prints, broadsides, watercolors, maps. The result is as sumptuous to look at as it is delightful to read.

For three centuries *A Tour* has been mined by historians for information about early 18th-century Britain, but what makes it so much fun for the modern reader are its anecdotes, its odd bits of social history, the glimpses of Defoe's personality, and his sturdy plain prose. The bedrock of all these is the book's sheer authority: Defoe—businessman, journalist, spy, ex-con—simply knows what he's talking about. When he arrives in a town he looks at it like a real-estate speculator, judging its merits, tallying social debits and credits, surveying buildings, debriefing major citizens.

In the damp coastal village of Wyvenhoo, Defoe learns—from what he calls with striking modernity "oral tradition"—that its men are said to go through as many as 14 or 15 wives, chosen from women who live up in the nearby hills. The husbands "took the young lasses out of . . . their native air into the marshes among the fogs and damps" and "there they presently chang'd their complexion, got an ague or two, and seldom held it above a year at most; and then," blithely concludes Defoe's informant, "we go to the uplands again, and fetch another." At Newmarket he tells of a famous race-horse trainer who always manages to get good betting odds for his favorites by chicanery. If a horse "was as light as the wind, and could fly

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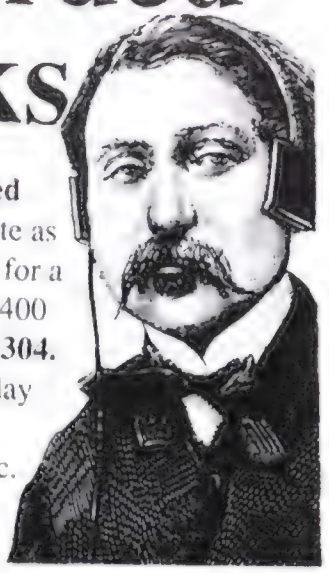

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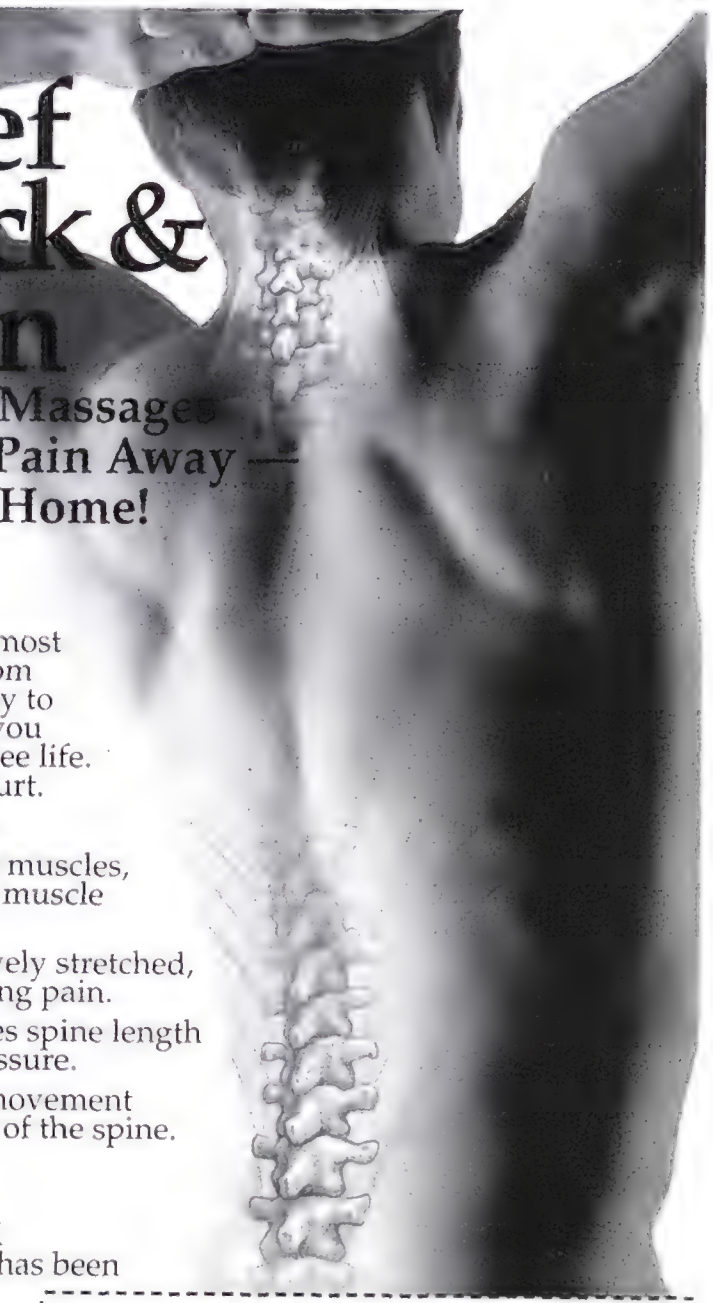

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like a meteor, he was sure to look as clumsie, and as dirty, and as much like a cart-horse as all the cunning of his master and the grooms could make him."

Though Defoe displays a particular interest in merchants and entrepreneurs, he also mingles with the upper crust. At Tunbridge Wells, famous for its healthful waters, "company and diversion is . . . the main business of the place; and those people who have nothing to do any where else, seem to be the only people who have any thing to do at Tunbridge." After describing the pleasures of this town of flirtation and self-indulgence, he adds, "Tunbridge wants nothing that can add to the felicities of life, or that can make a man or woman compleatly happy, always provided they have money; for without money a man is no-body at Tunbridge, any more than at any other place, and when any man finds his pockets low, he has nothing left to think of, but to be gone, for he will have no diversion in staying there any longer." Here, clearly, one detects the voice of the bankrupt.

Naturally Defoe visits Windsor Castle, and relates a charming anecdote. "On the outside [of the castle] was added, the Terrace Walk, built by Queen Elizabeth, and where she usually walked for an hour every day before her dinner, if not hindered by windy weather, which she had a peculiar aversion to; for as to rainy weather, it would not always hinder her; but she rather loved to walk in a mild, calm rain, with an umbrella over her head." Such bits of delicious trivia give airiness, and a relief from matters mercantile, to this sprawling love letter to Great Britain.

For Defoe loves his country. One village grows the most delicious cherries anywhere, the town of "Chedder" makes "the best cheese that England affords, if not, that the whole world affords," the Royal Exchange is "the greatest and finest of its kind in the world." Every page carries its superlative. Some of them may sound jingoistic, but what shines through is a deep patriotic pride. *A Tour* focuses not on vanished glories but on present achievements, especially those dealing with trade and business. Defoe writes enthusiastically about the wool industry, mining, spinning, agriculture, fishing, building. He describes herds of up to a thousand turkeys and geese being driven to London.

Unlike many travel guides, *A Tour* is logically organized into 17 circuits, tak-

ing in all the counties of England, Wales and Scotland. At the very center of the book lies the description of London, which for Defoe is England's hub, the boisterous, rudely healthy capital that devours the produce, livestock and goods of the rest of the country. You can tell that it's also his home and that he wouldn't live anywhere else.

In the introduction to his own fine edition of *A Tour* (available in paperback from Penguin, for those on a budget) 18th-century scholar Pat Rogers calls Defoe's guidebook the liveliest ever written. He also sees it as a kind of English epic. That may be, but today's readers will find it above all a way to escape, not so much to an Augustan world of measure and elegance, but to a rowdy, lusty world where everything is for sale and Moll Flanders is queen.

Michael Dirda is a writer and editor for *Washington Post Book World.*

All But the Waltz
Mary Clearman Blew
Viking, $19.95

If you escape the Interstate on the high plains east of the Rockies and drive the shimmering two-lane roads through fenced rangeland and sagebrush flats and dusty one-light towns, you'll eventually come to a graveyard. Chances are it will be bare of trees, with a sagging fence and tombstones canted by the wind. Small-town graveyards on the plains convey a sense of the bravery and loneliness and sadness of life and death in the American outback, the sheer effrontery of trying to make a living in such harsh country, the random violence of nature, the importance of competence and of neighbors.

The collection of essays about her Montana family that Mary Clearman Blew calls *All But the Waltz* has the feel of one of those Western cemeteries. Her style is spare and plain in the Western manner, often understated, the words bitten off sharply the way cowboys sometimes speak. Chronicling the lives of several generations of her ranching clan in the Judith River country of central Montana, the author evokes one of the most remote and isolated parts of the lower 48 with what appears to be effortless ease.

Mary grew up so far from pavement and supermarkets that "it was a mild surprise in those days to meet someone I was not related to." When strangers turned up at the ranch she hid in leaves "like a coyote pup." She didn't start school until she was 8, and to enable her to do so then, her cowboy father had to buy a place closer to town. She and her sister were ranch girls who could do anything the boys could do. At school the teenage Mary discovered that her "poodle-cut and pearled classmates" were no match for her in arm wrestling, but when she tried to demonstrate her prowess to her hardhanded grandmother it was another story: "It was like arm-wrestling with one of her own cedar posts. Without a quiver, without seeming to flex her stringy arm, she pinned mine to the table."

The cowboy ethic has never really perished in the Montana backcountry, as it has in so many parts of the West. Her father never understood why anyone would work for wages, punch a time clock and take orders, after he had been his own boss. You were as good as your word, you helped your neighbors and they helped you, and you minded your own business. "He was another old Montana rancher," her cousin Willie says of one man, "and the last

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thing he would have done was ask another man his business."

It is a culture that makes a fetish of privacy while scorning deviations from the norm. It seems a contradiction, Blew writes, that "westerners, so tolerant of the eccentric, the loner, or the crazed . . . can simultaneously harbor such dread of cultural difference," as Indians and Asians have learned. Perhaps it is inevitable, she speculates, that the inhabitants, "made up entirely of displacers, should fear displacement."

The essays I liked best were "Reading Abraham," about Blew's attempt to understand a collection of strangely lyrical scraps of writing left behind by her great-grandfather, and "Dirt Roads," in which she tries to come to terms with her father and the strange way he died. Her great-grandfather Abraham was a surveyor, a man whose job it was to "convert landscape into property." Blew pores over his smudged and near-illegible scratchings, descriptions of what he saw on his surveying rounds, with the excitement of a writer discovering another of the species in the family, but in the end she concludes sadly, "His vision, like my father's, was linear; it ruled out the faces on the margins or at the shrunken end of his perspective, and one of those faces was mine."

Her father, whose code permitted a woman to aspire no higher than schoolmarm, demeaned her ambition in words burned on her heart—"*Somewhere you got the idea in your head that you know something, but you don't know a god-damned thing.*"

Mary Blew eventually liberated herself the hard way, with an early marriage and pregnancy, but she remained conflicted about her father until the day he climbed into his red truck, drove to another part of the state, lay down on a hillside and died of exposure.

For another writer these essays would have been the raw material of fiction, but the author chose to present them as memoirs written with respect for facts and with lean Western directness. It seems to me that it works fine this way, aided considerably by her gift for phrase-making—"my grandmother brought with her the breath of elsewhere" (I had one like that too), "his grasshopper's delight in the sunlit present," "the certainty of apples." Mary Blew teaches at Lewis and Clark State College in Lewiston, Idaho. I hope she takes a lot of sabbaticals and tells us more about her gritty

family and their adventures on the unforgiving Montana plain.
Donald Dale Jackson, who grew up in the West, now writes from New England.

Catapult: Harry and I
Build a Siege Weapon
Jim Paul
Villard Books, $18

The things we have ordinarily associated with war in this century seemed beside the point in Operation Desert Storm. As "smart bombs" and computerized missiles streaked across the skies and our TV screens, bullets, trenches and guerrilla fighting—the worlds of the Western Front and the Mekong Delta—became relics of the past. Technology, the pundits tell us, won the day in the Gulf; surgical strikes appeared to sanitize the messiness of war, transforming it into a kind of video game.

In his first book, finished before the Iraqi invasion of Kuwait, Jim Paul reminds us that however sophisticated the weapons of 1991, war is still about spilling blood with machines created for that purpose. In this account of how he and his friend Harry built a catapult to hurl rocks into the Pacific Ocean, Paul explores why our species has always felt compelled to make such machines.

In the end, he decides that the compulsion is not an anomaly but part of our nature—something humans do instinctively. Building weapons offers order in a disorderly universe; technology is a way of making the elements do what you want them to do. This is the dark lesson Paul learns along the way.

Meanwhile, Paul and friend Harry have an enormously good time. Paul, a journalist and poet, writes wittily about matters large and small. There are amusing, revealing sketches of Archimedes, who perfected the catapult, and Flavius Josephus, who chronicled its use in the Roman sack of Jerusalem. With an equally keen eye, Paul describes Oakland, California, welding shops, demolition yards and a Chinese take-out restaurant. If P. J. O'Rourke had turned his hand to history, this book—or something very much like it—might have resulted.

"It had occurred to me that holding an old rock might be like looking at the stars," Paul begins. His voice is quirky, and he emerges as a man you'd like to spend the day with. It is not to everyone, after all, that such a thought would simply "occur." The story opens in Utah, where Paul is writing about Dinosaur National Monument for the *Washington Post*. He had felt uncomfortable around the dinosaur bones, imagining them to suggest that Earth really didn't need human beings. An old rock, he thought, might give him some perspective: "I hoped an ancient rock would resolve things, would get me beyond this sense that gigantic alien forces, big reptiles among them, had always possessed the earth. The rock might let me feel some intimate connection to the immensities of the past."

So Paul picks up a piece of Red Creek quartzite, 2.5 billion years old, and takes it back to San Francisco as a "talisman against the past." At the airport he is asked to show the rock at the security checkpoint. "It was just a rock, I said, not a weapon."

Back home, he calls Harry. They chat; Paul is playing with his souvenir rock. "Without thinking about it much,

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I said, 'You know what I'd like to do with you, Harry? Build a big catapult and shoot stones into the ocean.' The idea was a whim, a surprise from some dark corner of my mind. I knew it would appeal to Harry, but I didn't expect him to take it as seriously as he did. . . . 'That'd be fun,' he said. 'But I don't have time to do something like that. Besides,' he added, 'you never make stuff. If we ever made anything together, I'd do all the work.' 'I make stuff,' I said. What had I made lately? I thought. A paragraph, a sandwich."

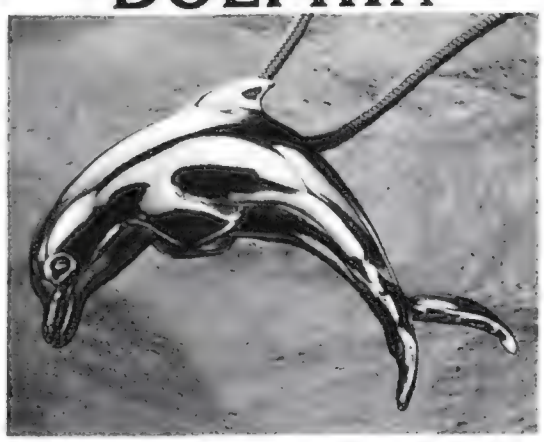
But Paul persists and the "whim" becomes a proposal to the Headlands Center for the Arts in Sausalito, which gives him a $500 grant to explore "catapult consciousness." With tongue firmly in cheek, Paul argues that his project will be a "Conceptual Reconstruction" of the craft of weaponry and warfare. Harry is incredulous: "And they bought that?"

Paul looks at catapults, cannon, bullets, even nuclear weapons. The catapult's history is central: it stunned the Romans as they besieged Syracuse in the third century B.C. Stones rained down on the Roman ships as if from the heavens. "In this sense the invention of the catapult—and this shock at being so overmatched—was a psychological watershed for humanity, and a difficult one for us to imagine, living in a world animated by the unseen power of machines."

This technological progress is one of the great facts of history. Paul began the project thinking he would put on the "mask" of the weapon maker and play out a temporary role. His book is the compelling personal story of how he realized there is no such separate mask. There is only the human propensity for control and domination. Admiring the finished catapult in Harry's West Oakland yard the night before they fire it, Paul sees suddenly that he and Harry have, as it were, replayed an ancient rite: "The weapon had possessed us, I thought, as we stood in the dark. . . . There we were—it was us, Harry and Jim, not a pair of gun freaks—amidst this quiet neighborhood of families, shouldering this big brutal object, a thing almost too heavy to bear, and pointing it at the house next door."

It is sad to see the book end and the catapult fire, for Harry and Jim are very good company. Beyond the wit and the friendship, though, Jim Paul realizes that we belong to a race that

BOTTLENOSE
DOLPHIN



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sees weapons not as aberrations but as unhappy extensions of ourselves. At the height of his success, while one small Confederate battery repulsed a Federal charge at Fredericksburg, Gen. Robert E. Lee remarked, "It is well that war is so terrible, or we should get too fond of it." Paul would agree.

Jon Meacham, a writer and reviewer, reports for the *Chattanooga Times.*

There Are No Children Here
Alex Kotlowitz
Doubleday, $21.95

Occasionally in the realm of our culture, even in its jaded and skeptical, if not cynical, precincts, a book arrives with a moral energy that smashes all obstacles, it seems, and touches powerfully hearts seemingly embittered, minds all too sure of themselves. Such is the book Alex Kotlowitz has given us at the start of the last decade of this century.

The book can be summarized all too briefly—in the words of its subtitle, "The story of two boys growing up in the other America." The boys, Lafayette and Pharoah Rivers, brothers, are black, and the place where the author, a journalist who works for the *Wall Street Journal*, met them is the Henry Horner Homes, a stretch of public housing in Chicago where drugs and crime, even murders, and teenage pregnancy are routine aspects of life.

Unfortunately, what has become routine for millions of blacks has become, in its own way, routine for many of us who are white and relatively well-off. And so, the temptation when told yet another story of poverty and racism and suffering and vulnerability—a story of people half a step, at best, away from disaster, even death—is to nod our heads, or indeed, shake our heads. Not so much in boredom or disbelief (although such responses cannot be ruled out for a good number of us), as in exhausted frustration and perplexity. We wonder what is to be done—and not rarely, we conclude that the entire problem, enormous and seemingly ever so complex, defies comprehension, never mind any effort at remediation.

It is the great and singular virtue of this book that it will enable many readers to break their way out of such an intellectual and ultimately political impasse. For one thing, the author's original articles on the world of the Henry Horner Homes, published in the well-known and important left front-page

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column of the *Wall Street Journal* in late October of 1987, created a substantial stir. The writer's vivid and compelling reportorial prose, his searching skill as an observer, both empathic and just detached enough to avoid sentimentality, won the interest and concern of an influential readership.

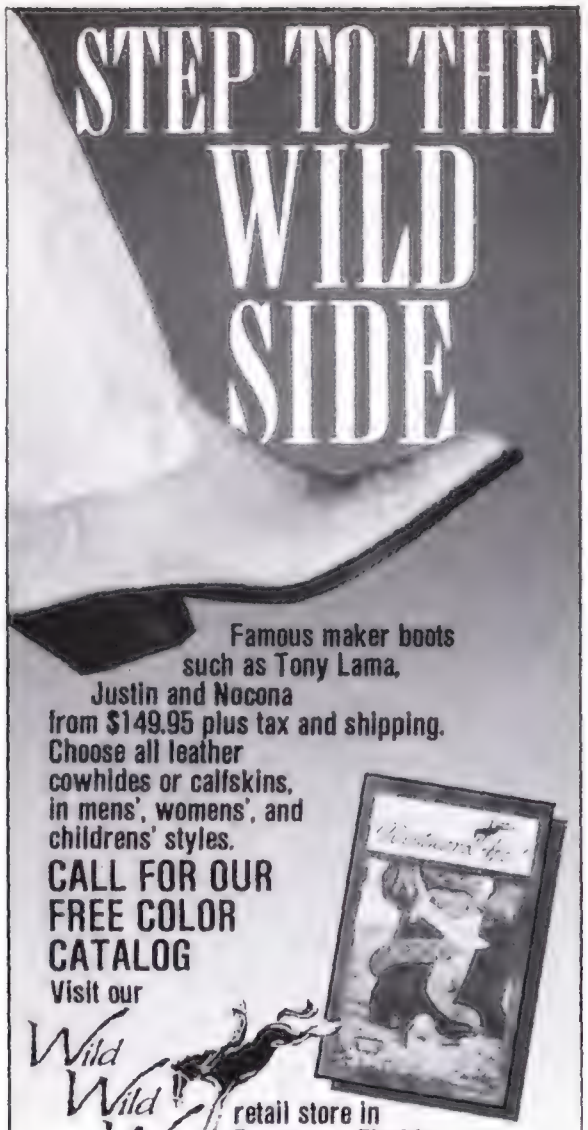
The same outcome has obtained for the book—the best-seller lists and much attention from reviewers. In the words of a black Harvard undergraduate student of mine: "I never thought the country would pay so much attention to this these days." The "this" he had in mind is, of course, the condition of our ghettos, the kind of life they offer to the children who are unlucky enough to be born in them, to grow up in them. The author has spent years in that one Chicago project; he has earned the trust of his informants; he knows how to take the measure of their lives; and he is a skilled, sensitive narrator who has a keen eye for the daily particulars of a melancholy and quite fearfully threatening neighborhood.

He wants to inform us, but not hector us—and he lets his chronicle of the brutal, grim and dangerous scene, as related by him, do the work of persuasion. Another element in the book's persuasiveness, of course, is the fullness of characterization given us—a most remarkable documentary effort. We come to know these boys, their mother, others in their world, both kin and neighbors, and relative strangers. The considerable ingenuity of the people described, their tenacity of spirit, their occasional moments of real courage and decency, in the midst of such an overwhelmingly bleak set of circumstances, connects with our own humanity, our sense of what it is for someone to be a fellow citizen, and even a kindred spirit.

Such an accomplishment on the part of a talented, morally awake, conscientious writer will not, alas, do much for those young in years but already worn down and endangered. The author lets us realize that Lafayette and Pharoah and their friends are not "children" in our sense of the word (full of innocence and expectation and hope). Still, the people Alex Kotlowitz came to know so well, and describe so carefully and respectfully, are in need of the help of those of us who read the *Wall Street Journal* and who buy books such as his.

Robert Coles, a child psychiatrist at Harvard, wrote *Children of Crisis.*

STEP TO THE WILD SIDE



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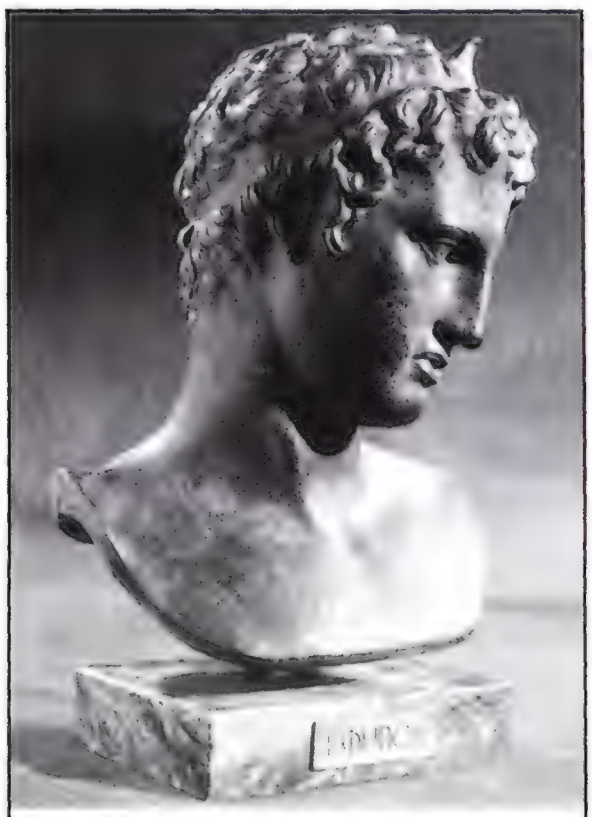

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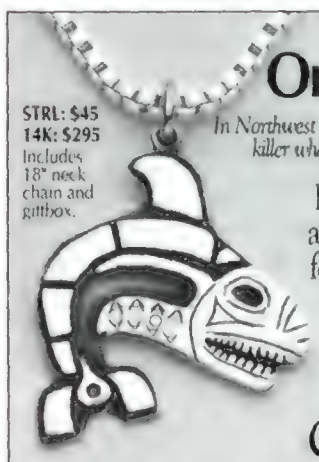

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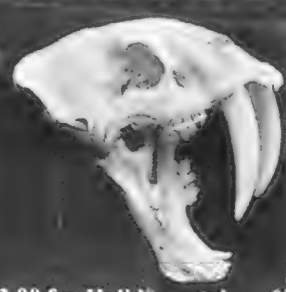

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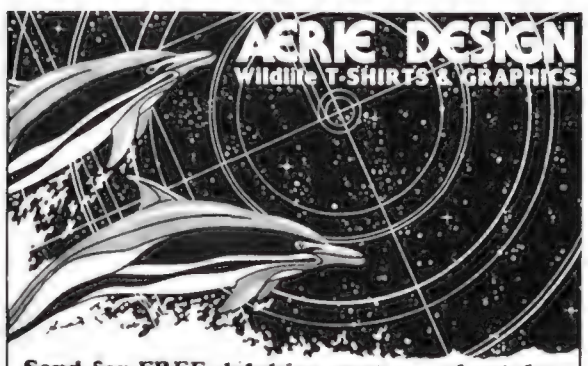

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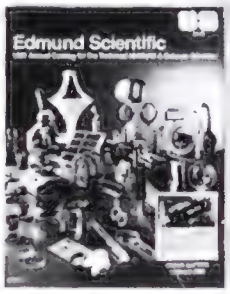

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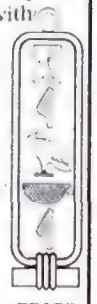

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Planning a Smithsonian visit?

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Freer remains closed

The Freer Gallery of Art is closed until late 1992.

Commons Dining Room and Associates' Lounge close for a day

The Commons Dining Room and Associates' Lounge facilities in the Castle will be closed all day Monday, October 7.

National Hispanic Heritage Month

The Smithsonian continues to celebrate National Hispanic Heritage Month, September 15-October 15, with a variety of programs and activities. For information call (202) 357-2700 (English, live-voice), 9 A.M. to 5 P.M. For 24-hour recording, call (202) 357-4574 (Spanish) or (202) 786-2122 (English).

Special October exhibits and events

National Museum of Natural History

Seeds of Change (October 26-April 1993) Major exhibition explores dramatic changes brought about by the exchange, begun 500 years ago, of sugar, corn, the potato (see page 138), the horse

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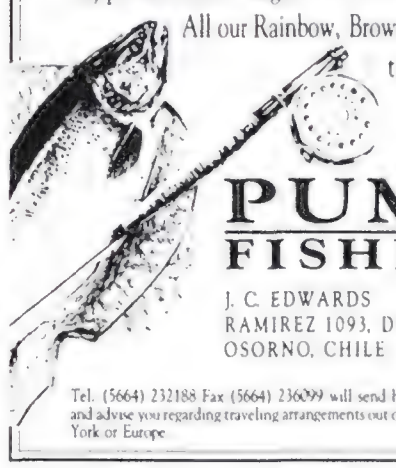

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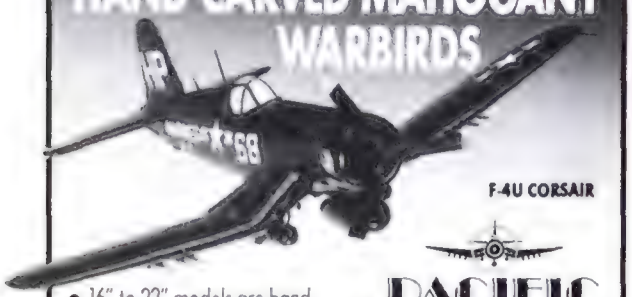

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Based on a 1519 description of the Aztec Great Market of Tlatelolco, mural by Hugh and Anne McKay opens NMNH exhibition "Seeds of Change."

and disease among cultures. Show commemorates Columbus' voyages to the Americas.

A Separate Vision (through November 17) Exhibit showcases works by four contemporary native-American artists.

National Museum of American History

Nusantara: Lands and Peoples of Indonesia (through December 31) Rare books dating from the late 16th through 20th centuries.

The Tool Chest (runs indefinitely) Display of 15 tool chests features ingenious piano-maker's chest containing some 250 tools (SMITHSONIAN, February 1991).

300 Years of American Papermaking (through December) A commemoration of craft and trade.

National Air and Space Museum

Art of the Cosmic Age (through December) Exhibit features the work of contemporary Soviet, American, Canadian and European space artists.

Exploring New Worlds (opens October 11) New show at the Albert Einstein Planetarium examines the history and future of exploration.

Hirshhorn Museum & Sculpture Garden

Recent Acquisitions: 1989-1991 (October 8-January 5, 1992) Paintings, sculptures and works on paper by such artists as Francis Bacon, Joan Nelson, Ed Ruscha, Robert Colescott and Henry Moore.

Directions—Saint Clair Cemin (October 17-January 19, 1992) The Brazilian-born sculptor's first solo show in an American museum.

Picasso Linocuts from the Museum's Collection (through November 11) Linocuts from 1962-63 show inventiveness of Picasso in late life.

National Museum of American Art

Homecoming: William H. Johnson and Afro-America, 1939-1946 (through March 1, 1992) Works by the African-American painter portray the black experience in this country during the late 1930s and the years of World War II.

National Portrait Gallery

Group Portrait: The First American Avant-Garde (through October 27) The circles of Alfred Stieglitz, Marcel Duchamp, Gertrude Stein and Ezra Pound.

Lincoln and His Contemporaries: Photographs by Mathew Brady from the Frederick Hill Meserve Collection (through February 17, 1992) Images of mid-19th-century Americans.

Recent Acquisitions (through October 27) Works of art acquired during the past year that depict notable Americans.
The "Edgehill" Portrait of Thomas Jefferson (through 1992) The painting by Gilbert Stuart.

Arthur M. Sackler Gallery
Indian Paintings and Drawings from the Collection of Howard Hodgkin (through January 12, 1992) Works from the collection of the contemporary British painter represent India's three major regional styles—Rajput, Deccani and Mogul.
Crushed Lapis and Burnished Gold: The Art of Illumination (through December 8) A selection of manuscripts from the Sackler's Vever Collection.
The Arts of China (runs indefinitely) More than 200 objects, including sculptures and paintings, span 6,000 years.

National Museum of African Art
The Art of the Personal Object New permanent exhibition examines the forms and functions of utilitarian objects from Africa. Show includes chairs, headrests, pipes, drinking horns.
Africa Illustrated: Fantasy and Reality Before 1900 (through November 10) Exhibit of early history, ethnology and travel books on Africa.
African Reflections: Art from Northeastern Zaire (through January 12, 1992) The refined and delicate art of the peoples of northeastern Zaire.

Arts and Industries Building Experimental Gallery
The Good, the Bad and the Cuddly: Human Attitudes Toward Animals (through November 3) Exhibit encourages visitors to assess their own attitudes toward animals.

Anacostia Museum
Kaleidoscope: African-American Photography in Washington, D.C. (through November 3) An exhibition of selected views from some 30 area photographers.

Renwick Gallery
Improvisation in African-American Quiltmaking (through January 4, 1992) Display of work of contemporary quiltmakers highlights esthetic ties to textiles of the Congo and West Africa.

International Gallery, S. Dillon Ripley Center
Degenerate Art: The Fate of the Avant-Garde in Nazi Germany (October 16-

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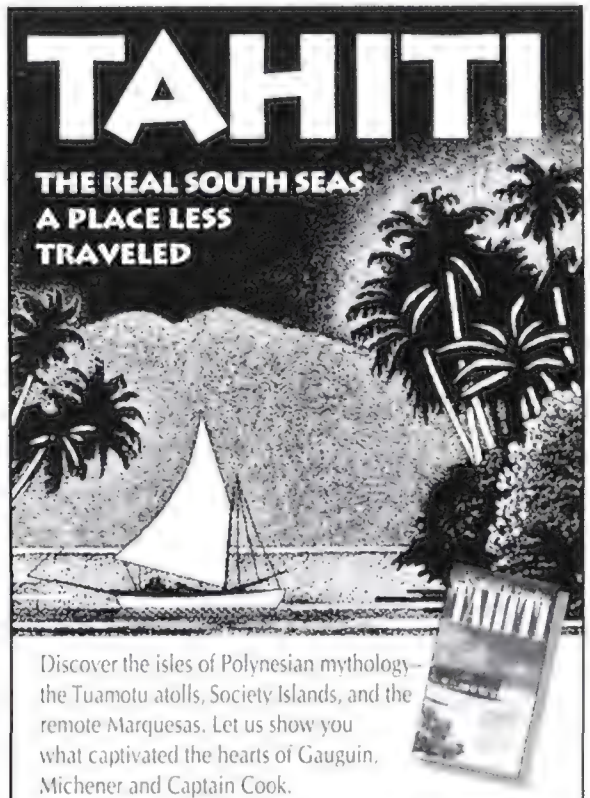

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January 5, 1992) Show organized by the Los Angeles County Museum of Art features 175 of the artworks originally assembled by the Nazis for their 1937 "Degenerate Art" exhibition (SMITHSONIAN, July 1991).

National Museum of the American Indian (New York)
A Gift from the Heart: Two Pomo Artists (through December) Baskets and ethnographic models of traditional ceremonial objects by California Pomo artists William and Mary Benson.

Cooper-Hewitt Museum (New York)
The Cooper-Hewitt Collections: A Design Resource (through August 1992) Some 1,200 objects chronicle the history and collecting philosophy of one of the most important repositories of design.

Exhibition catalogs

Catalogs available currently include:
Homecoming: The Art and Life of William H. Johnson (paper, $29.95; cloth, $45)
Who'd A Thought It: Improvisation in African-American Quiltmaking (paper, $18)
Strange Bedfellows: The First American Avant-Garde (cloth, $35)
To order, send check or money order to Smithsonian Museum Shops, 8308 Cinderbed Road, Newington, Virginia 22122. Include 15 percent of purchase to cover postage, handling (minimum, $1.75).

Smithsonian on the air

Smithsonian Presents Invention: Series of half-hour television programs explores spirit of innovation behind invention. Tuesdays, 9:30 P.M., EST, the Discovery Channel. Check local listings.
Speakers Corner with Roger Mudd: New weekly radio series presents one-hour lectures by scholars and experts from around the world to audiences at the University of Chicago, the Smithsonian Institution and England's Oxford University. Check local listings.
Folk Masters: A series of one-hour radio programs featuring award-winning performers of traditional music in the Americas. Check local listings.

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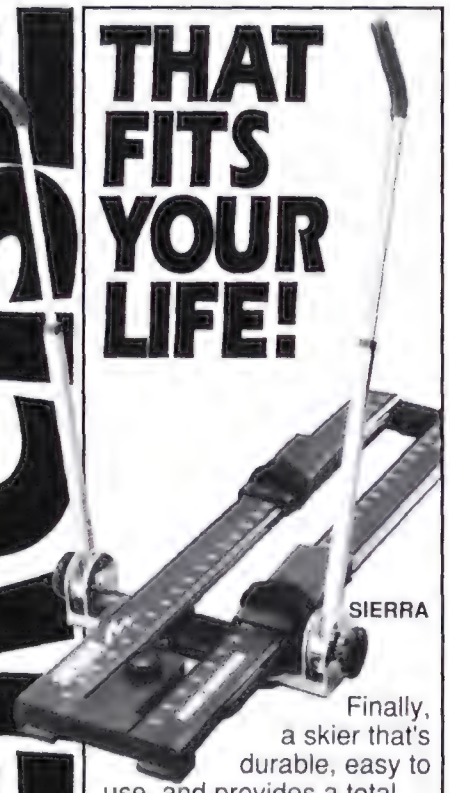

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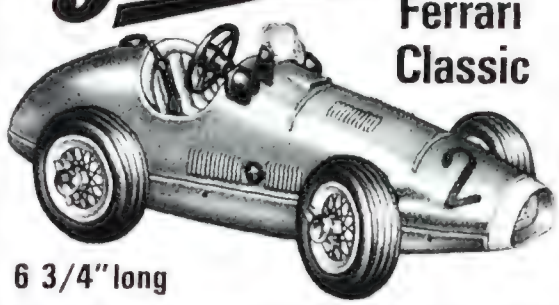

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this month. Events in Bozeman (October 11-13) will include lectures on Civil War photography and native-American art. The program in Billings (October 11-13) will feature lectures on 18th-century American clothing, and space science. Associates in Bozeman and Billings will receive brochure invitations. For further information, write or call U.S. and International Events Program, 490 L'Enfant Plaza, S.W., Suite 4210, Washington, D.C. 20560; (202) 287-3210.

Resident Associate Program

To become a Resident Associate, or for fee and ticket information, call (202) 357-3030. Here are some October events:

Lhamo Folk Opera of Tibet (October 14; 7:30 P.M.) An ensemble of Tibetan artists presents a kaleidoscopic extravaganza of music and dance.

An Evening with Norman Mailer (October 18; 8 P.M.) The distinguished author reads from his long-awaited new novel, *Harlot's Ghost.*

An Undeclared War Against Women? (October 22; 6 P.M.) Discussion by Pulitzer Prize-winning journalist Susan Faludi.

Israel "Cachao" Lopez and His Cuban Mambo Orchestra (October 27; 7:30 P.M.) Relive the golden age of "mambo madness."

Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some October exhibits:

- The Bronx, New York (October 19-January 5) *Contrasts: 40 Years of Change and Continuity in Puerto Rico. Photographs by Jack Delano,* Bronx Museum of the Arts.
- Fremont, California (October 26-November 24) *Paintbrush Diplomacy: Children's Art from the Americas,* Olive Hyde Art Gallery. See *Highlights continued,* page 184.
- Janesville, Wisconsin (October 26-November 24) *After the Revolution: Everyday Life in America, 1780-1800,* Rock County Historical Society.
- Ottawa, Ontario, Canada (October 17-February 16, 1992) *Crossroads of Continents: Cultures of Siberia and Alaska,* Canadian Museum of Civilization.

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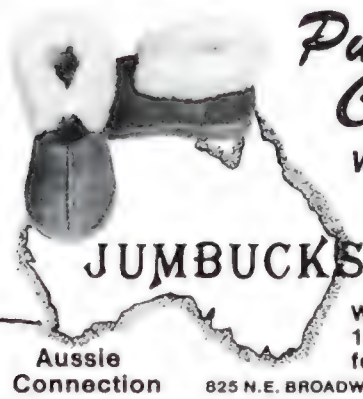

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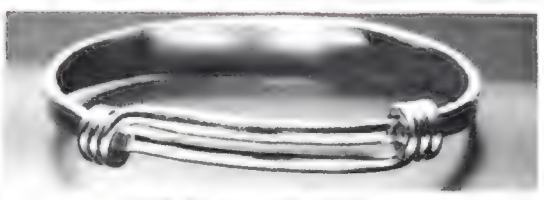

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Highlights continued

Art across the borders

As artist Char Pribuss travels the world with her husband, Rudy, she never stops painting. From Chile to Nepal, she sets up her easel in the streets, intent on capturing the life of the country she is visiting. Inevitably, children gather round to watch her at work and to ask about America. Often, she ends up giving her paints and brushes to members of her young audience.

Those experiences inspired the couple, in 1972, to establish a program that allows children to share their own creations across cultures. The result of the Pribusses' efforts is Paintbrush Diplomacy, a San Bruno, California, organization that sponsors international classroom-to-classroom art exchanges.

Paintbrush also has amassed a collection of some 2,000 artworks. Seventy-seven of these pieces, representing the work of young artists from Central, South and North America, are now traveling the United States in "Paintbrush Diplomacy: Children's Art from the Americas," an exhibition organized by Paintbrush Diplomacy and the Smithsonian Institution Traveling Exhibition Service (SITES).

After opening in Fremont, California, October 28, the show travels to 16 cities, while Paintbrush continues to conduct a search for a permanent home for its growing collection.

Kathleen M. Burke

In *Afternoon on the East Side of Providence, Rhode Island*, 11-year-old Karen Fournier celebrates a city.

An anonymous young artist from Rio de Janeiro depicts landscape with a surrealist's bent in *Yellow Trees*.

Enjoying the Coconut, by Suzie Barnaby, age 11, evokes a festive harvest near Portland on the island of Jamaica.

Twelve-year-old Jeffrey Kluckner's *Snowy Day* offers cat's view of a winter afternoon, Vancouver, British Columbia.

SMITHSONIAN SEMINARS AND EXPEDITIONS

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(for tours, see page 99)

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By Bruce Watson

How HyperTime flies whenyou'reontherun

It happens every morning now. Your mental clock seems to be running a little slow. You look at your watch. It's 9 o'clock. You go for coffee, and it's 10:30. Ten minutes later it's 11:15. Another morning lost in HyperTime.

HyperTime is not some impractical joker's answer to daylight saving time (which, as you are no doubt well aware, goes off at 2 A.M. on the 27th of this month). It's a new chronological system invented by two engineers at Timesis, the noted time consulting firm. Ruthlessly exploiting our trust in public timepieces, HyperTime, whose secrets are revealed here for the first time, is the reason days aren't as long as they used to be, children grow up too soon and nobody can believe what month it is already.

It began a few years ago when Timesis engineers discovered that if a clock in an airport, bank or government building runs ten minutes fast, 998 out of 1,000 people set their watches ahead. Armed with this knowledge and a little R&D money, Timesis developed the system of digital accelerators it calls HyperTime.

HyperTime started "big time" out West, of course. Arizona was concerned about lagging productivity. In 1986, the State Legislature consulted Timesis, then secretly installed HyperTime accelerators on all public clocks. Cutting just five minutes from each hour, Arizona went on the 22-hour day. Overnight everything changed.

Trains ran on time. Buses left early. Planes leaving Phoenix arrived in Tucson before they left, but the luggage was late. The Phoenix Suns beat the Lakers in undertime. Across the state, babies cried for no reason, dogs barked and there was a restlessness among cattle, horses and physics professors. When the sun set almost two hours ahead of schedule, Arizonans were left shaking their heads and making lists for the next day. But the next day they began running just to keep in place. The Legislature looked at the productivity figures and saw that they were good. HyperTime was here to stay.

Not to be outdone, California passed a 21-hour day, and soon the freeways were like greased lightning. The Dodgers beat the Giants in 7 innings—game called because of time. Instead of doing lunch, Hollywood agents and celebrities did breakfast. Sometimes they met at 8 A.M. to do last night's dinner.

Florida secretly adopted a 20-hour day. Other states switched to HyperTime, and within six months that should have been a year, the United States became one country with 17 different time zones. As the 1980s raced to a close, harried Americans formed time support groups and bought timeshare condos. Wondering if there had been more time in the past, millions bought Stephen Hawking's *A Brief History of Time* but couldn't find time to read it. Then Congress stepped in.

At first, the legislators complained that HyperTime would shorten their terms in office. But the President said an 18-hour day was the only way America could compete with the Japanese who, as everyone knew, ran on a 16-hour day and sent their kids to school on Saturday. The bill passed in no time, setting the entire country on the uniform 18-hour day. Now we live in the land of perpetual "I gotta go."

A day on HyperTime: up at 6 instead of 6:30. Have to get a new alarm clock if there's time. A two-minute shower, a one-minute egg. "Hikidshow'sschool? Great! Youaremykidsaren'tyou?" A nanosecond hug and off to the Indy 400 already in progress. Twelve hours of hard labor to do in only six, lunch under the eye of the clock and a microwave-coffee break. On the way home, listen to *Most Things Considered*, then "Schubert's Unfinished Symphony—The Highlights." Pick up some minute steaks and then home for a quick glance at *Time* magazine, and bedtime. Under HyperTime, everything is shortened. Even the NBA season seems to have an end.

As founder of the Day Rights Movement, I think it's time America slowed down. If we don't do something soon, we'll go spinning out of control. Arizona is already considering a 15-hour day, and Congress is on the verge of a drastic step.

Last month, after skimming Stephen Hawking's book, three Senators introduced the "Imaginary Time Bill" (S.B.-1). If passed, the bill would place the entire country on "imaginary time"—that is, time measured in imaginary numbers. Timesis engineers are already developing imaginary-time accelerators to send the nation's clocks spinning and calendar pages falling away. If you measure an event with imaginary time, Hawking says, the distinction between space and time disappears. Time becomes space, and both become money, especially for Congress. Election campaigns might overlap without anyone caring. PAC contributions could be calculated in imaginary numbers. Incumbents could serve for 10, 20, 30 imaginary years. Imaginary time would make a mockery of our political process.

The Day Rights Movement urges you to pick up your car phone or boot up your fax and tell Congress you want a constitutional amendment guaranteeing 24 hours in every day for every American. The movement has to begin somewhere. Let it begin here and now. We haven't a moment to waste.

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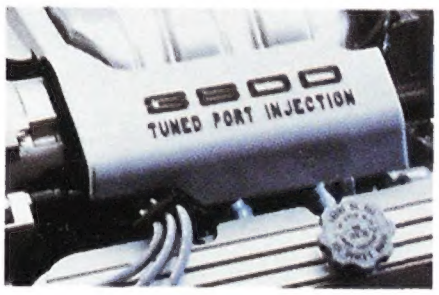

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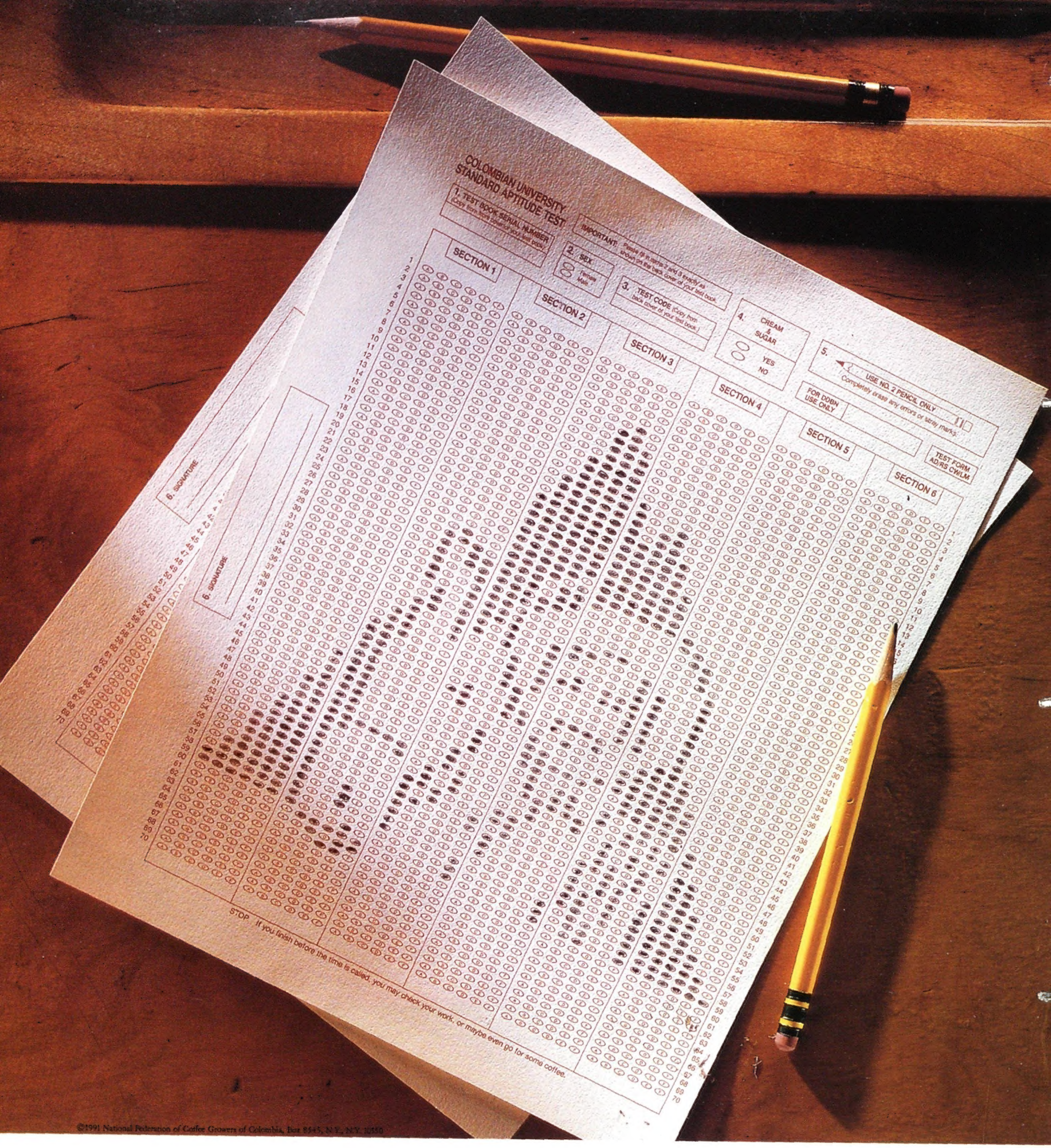
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